THE GARDEN JOURNAL

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THE GARDEN JOURNAL

THE NEW YORK BOTANICAL GARDEN

DOROTHY EBEL HANSELL
Editor

This issue is dedicated to good gardeners everywhere, but especially to iris growers whose organization, the American Iris Society, began at The New York Botanical Garden on January 29, 1920, and who will celebrate this event during their visit to the Garden on May 26, 1961.

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CALENDAR

May 15, 1961. Annual Meeting of The New York Botanical Garden.

May 16, 1961. Torrey Botanical Club meeting at The New York Botanical Club.

May 18, 1961, 11 a.m.-6 p.m. House and Garden Tour for benefit of the Patients Special Project Fund of the Institute of Physical Medicine and Rehabilitation of New York University Medical Center. For information, call Or. 9-3200, Ext. 83.

May 25-29, 1961. Annual Meeting of the American Iris Society: headquarters, Robert Treat Hotel, Newark, N. J.

May 26, 1961, 3 p.m. American Iris Society visits The New York Botanical Garden and celebrates its founding at the Garden forty-one years ago.

June 13, 1961. Nineteenth Annual Rose Day at The New York Botanical Garden.

September 5-9, 1961. Garden Holiday at Lake Mohonk House, Mohonk Lake, New York.

October 25-27, 1961. Sixteenth Annual American Horticultural Congress, Northampton, Mass.

April 27-May 7, 1962. Floralies, International Horticultural Exposition under auspices of Société d' Horticulture and Jardin Populaires de France in Valenciennes, France.

August 31-September 8, 1962. Sixteenth International Horticultural Congress, Brussels, Belgium.

April 26-October 1, 1963. International Horticultural Exposition, Hamburg, West Germany.

CREDIT FOR ILLUSTRATIONS

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BEARDED IRISES IN THE MIDDLE HEIGHT

By BEE WARBURTON

Mrs. F. W. Warburton of Westboro, Massachusetts, is one of the founders of the Median Iris Society—the Median Section of the American Iris Society. She served as secretary for five years and is now serving as president.

THE AMERICAN IRIS SOCIETY classifies the entire range of the bearded irises in six groups, primarily according to their garden uses but also taking into account the interests of iris specialists in developing and promoting certain types. The middle-height range, between the dwarfs under ten inches and the magnificent varieties over twenty-eight inches tall, was divided into four distinct classes. These are the median irises.

This division takes into practical account the vast activity in amateur plant breeding during the present century, by which the genus *Iris,* and particularly its bearded section, has been especially blessed. When this latest classification was set up by the American Iris Society, the tall bearded irises, the best-known to all, had been improved to astonishing qualities; and the dwarf irises, familiar in their early yellows and purples, had been improved to an array of colors and forms still unsuspected by most gardeners. But the irises in between, now classed as the medians, had been sadly neglected.

In the 1950s the trend to smaller plants and flowers suited to post-war architecture, provided the impetus for the production of irises in the wanted middle heights. The tall bearded irises needed for parent stocks in this work had been bred to tetraploid concentrations of genes for coveted traits, and clones derived from species collected for the purpose held promise of future recombinations.

Initial successes from incorporating variants of species into present breeding stocks naturally led to a quickening of interest in the importation of new species from the wilds. Many of these species were collected or obtained from other collectors and sent to this country by Rudolf Hanselmayer of Austria. In 1954, Dr. L. F. Randolph, then head of the Scientific Committee of the American Iris Society and now its President, spent some months collecting in Europe and the Near East and brought back a number of variants of known species. On another trip, in 1959, after spending some months in India, he returned to America by way of the Near East, Russia, and Europe with another large collection of clones of wild species, some of them quite new to this country. This material is made available to hybridizers as fast as it can be tested for adaptability and increased for distribution. In the meantime, cytologists in Dr. Randolph's department at Cornell University are working on the relationships of these various bearded irises, and we have learned much that has been helpful in simplifying some of the problems of interbreeding irises of different chromosome counts and groupings.

The American Iris Society has listed the bearded species separately under each of the six classes of bearded irises; the species listed as miniature dwarfs, besides being among the best of rock garden or wild garden plants, are perhaps the most important in breeding median irises. Foremost among these for both purposes is *Iris pumila*—and here it should be noted that the use of the term "pumila" for all dwarf irises is deplorable. *Iris pumila* is a specific name bestowed by Linnaeus.

The first plants of *Iris pumila* used by hybridizers were color variants raised some twenty years ago from Russian seed by Robert Schreiner of Schreiners' Gardens, and a strain developed from these and some Austrian forms by Paul Cook of Indiana. The original Schreiner forms were 'Nana', 'Sulina', and 'Carpathia', and they are still of importance to hybridizers, as is another form collected on Crete and named 'Cretica'.

Iris pumila is tiny, within its limits extremely variable, and in hybrid combinations has an explosive capacity for many traits. Its great diversity of forms and colors endears it to hybridizers—even if they find it difficult to place their feet between adjacent plants, while they pluck the tiny stamens ripe with pollen. There seem to be three basic color variants of this species, the yellow, the red-violet or purple, and the blue or blue-violet, and these also produce charming personalities in form and pattern. It is a most remarkable species—a whole book could be written about it.

The miniature dwarfs include the diploid species *Iris attica* and *I. pseudo-pumila,* which are of importance for cytological studies, but are of minor value to hybridizers in comparison with the tetraploid *Iris pumila.*

The *I. mellita* and *I. reichenbachii* complex is important in modern hybridizing because of a valued new pattern derived from its germ plasm; this is the dominant pattern of white stands and blue falls. It is useful because all such bicolor patterns have heretofore been recessive in inheritance and hard to manage. This work was initiated by Paul Cook of Indiana, who has carried the effects of this pattern into advanced generations. 'Whole Cloth', one of the irises in *Life Magazine's* 1960 feature on irises, is from such breeding. 'Whole Cloth' is a lovely iris; the next generation from it—and still in the seedling bed—is indeed strikingly beautiful.

Variants and relatives of *Iris aphylla,* classed as standard dwarfs, are of intense interest to hybridizers who look for unsuspected patterns yet to come from them, in addition to what is already considered as derivative: branching, blue beards, and perhaps the accumulative modifiers that make black irises black. They are not the most prepossessing plants, being usually of poor form and with a very peculiar type of branching which gives them a bundled-up appearance. Their stems often fork directly from the rhizome,

and each stem rebranches, with all flowers on extremely slender stalks shorter than the foliage. This is not a handsome type of branching in larger hybrids; and yet, in subsequent combinations, selections may be made of desirable stalks with greatly increased numbers of buds. Hybridizers must know what they are about, when dealing with the species.

The *I. chamaeiris* complex, with members in both dwarf classes, is the most familiar of these bearded species groups, for to it belong the familiar purple and yellow "dwarf irises" of the past. The group is of some importance to the development of new median irises chiefly because it has by nature the same chromosome count and grouping as the new hybrids from intercrosses of tall bearded irises and forms of *I. pumila,* and is interfertile with the new hybrids. In spite of this, few improved varieties are available. Because as a group it is difficult to improve, it is being bypassed in present breeding plans. Included are *Iris chamaeiris, I. italica,* and *I. olbiensis* (the last two are larger than the first), mostly from Italy and the south of France and in cultivation for centuries.

The "flags" so prevalent in our South are relics of another truly ancient group widely distributed and even naturalized in many parts of the world. Such irises are the white *I. albicans,* which was carried about by the Moslems for a grave decoration, the bright red-purple *I. kochii, I. florentina* of commercial orris-root fame, and *I. germanica,* whose name serves as a misnomer for the entire tall bearded group. These play little part in modern hybridizing.

Our nineteenth-century predecessors in iris breeding struggled long and hard to get size into the offspring of the diploid species. The pallidas and variegatas which furnished most of their parent stocks are variable, and some of their forms are really small, about ten inches tall. Today's hybridizers make use of this inescapable dwarf heredity in the older named garden diploids, along with other newly collected diploid forms of wild species in attempting to create new table irises. We have a number of new forms of *Iris pallida* and *I. variegata* themselves, besides additional forms of *Iris cengialtii, I. perrieri, I. rudskyi,* and *I. reginae,* all classified under miniature tall bearded or table iris. So far hybridizers have failed to hit upon the right formula for producing these charming smaller plants for the tall bearded season, and this has surprisingly proved to be a most challenging problem in plant breeding.

I may have given the impression that median iris hybridizers are graduates in botany or related subjects. Nothing could be further from the truth. Breeders operate in any way suited to their own circumstances—from growing a few bee-set seed, or crossing any two pretty irises regardless of their germ-plasm, to the most skillfully planned project of a professional plantsman. Any of these approaches is just as likely as any other to give an individual plant worthy of being named and introduced; garden-worthy varieties are registered with the American Iris Society each year with a record only of the seed parent, or of neither parent.

The new classification of the American Iris Society was an attempt to bring order to the chaos of new hybrid types in all the sizes and seasons of iris bloom, and it has proved, in most respects, extremely successful. It was designed to give encouragement to breeders in working for favored types and to give direction to the Society's system of judging and awards. It also furnishes a sound basis for catalog listings and simplifies the buying of irises for garden uses.

Let us take a look at each of the four median classes. The definitions quoted were prepared for the plaques in the Presby Memorial Iris Gardens at Montclair, New Jersey, under the direction of Mrs. F. P. Walther.

The Standard Dwarfs

"The standard dwarfs are species and garden varieties from ten to fifteen inches in height, of varied characteristics and including all varieties of tall and dwarf parentage that have the height limits of this class. They generally bloom in the late dwarf season."

The American Iris Society classification adds that the stems may be branched or unbranched, "flowers three to four inches across, the leaves often as tall as the flowers, and not falcate. The class includes species and cultivars with chiefly forty or forty-eight chromosomes, including chamaeiris-type clones, the aphyllas," and hybrids of tall bearded irises with *Iris pumila.*

The majority of introductions in this class have been of the so-called Lilliput type, that is first generation hybrids of tall bearded irises with *I. pumila.* The first of these to be marketed in quantity in the early 1950s were labeled "Lilliput Hybrids" by Geddes Douglas, and the name stuck.

These are fine irises. With the introductions of Paul Cook, they have remained as standards and as the basis for any collection for nearly a decade. They also inspired a number of workers to make similar crosses and to try out various other combinations of species with all sizes of bearded irises. "Advanced generation hybrids" (F_2 or later) of complicated breeding are now becoming the rule. Every year adds to the selection of improved varieties in this useful group. In 1959 the American Iris Society established an award for the annual best of this class, to be called the Cook-Douglas Award in honor of the two men responsible for the first introductions in the class. The 1959 award was voted to 'Green Spot' and the 1960 award to 'Tinkerbell'.

Judging standards (the standards by which awards are given and by which hybridizers select from their seedling patches) for the class detail primarily a cushion type of plant, of happy growth and increase, with flowers held just over the foliage. Ideally, a sufficient number of flowers should be produced on the plant to make a good color splash; yet they should be well spaced to show the individual flower form, since the iris is primarily an architectural flower and its form is important even on the smaller and more intimate plants. These are charming flowers, ideally of flaring form with wide petals and ruffling, immensely variable in color and pattern combinations, far superior to anything previously available in their size and season. They may be white, yellow, orange, green, pink, or in various shades of violet, blue, or purple, or combinations of these. They have enormous matching or contrasting beards, they are fragrant, some are adorned with lace or velvet, and they may bloom at unusual seasons.

Some of the best varieties in the color classes are:

Pure white. 'Lilli-white', 'Easter Bunny'.
White, green markings. 'Green Spot', 'Snow Elf'.
White, blue markings. 'How Now'.
Creamy white. 'Brite'.
Yellow selfs. 'Baria', 'Brassie', 'Golden Fair', 'Pigmy Gold', 'Lilli-yellow'.
Yellow with fall coloring. 'Lilli-var', 'Coreop', 'Dancing Bee'.
Blue selfs. 'Small Wonder', 'Blue Denim', 'Fairy Flax'.
Blue with deeper blue markings. 'Jersey Lilli', 'Tinkerbell'.
Red-purples. 'Garnet Treasure', 'Red-Lilli', 'Pagan Midget'.
Dark violet. 'Little Shadow'.
Pastel blends. 'Spring Mist', gray-lavender; 'Tolita', 'Pastel Gem', blue and chartreuse; 'Truce', green-yellow; 'Lilli-green', greenish bicolor.
Plicatas (stitched edges) on white. 'Dale Dennis', 'Little Dogie'; on yellow, 'Wee Reggie'.
Pink. 'Lillipinkput'.

Intermediate Bearded

"The intermediates are hybrids of dwarf and tall bearded parentage, or advanced generations thereof, from fifteen to twenty-eight inches in height, with erect branched stems usually taller than the leaves. They bloom between the standard dwarf and the tall bearded seasons." In the New York area this would be around May 15.

The Hans and Jacob Sass Award, initiated in 1960 as an annual award for the best in this class, was given to Paul Cook's 'Kiss-Me-Kate'. This was an intermediate of a somewhat different breeding from the usual for these irises, but it was of the hybrid origin which is their norm; their earliness of bloom comes from a dwarf ancestor.

Their garden-value depends upon this earliness; most of the old-timers were hopelessly outclassed, if they ran over into the tall bearded season. Because of a sterility barrier it was formerly difficult to improve them by breeding among themselves, and this is still true; but it is now possible to create very handsome intermediate plants in the first generation of crosses between the highly developed modern tall bearded and the newer standard dwarfs. When good crosses of this sort have been outlined for the various color classes, it is unlikely that many breeders will try to improve them by intercrosses. A more productive type of breeding appears to be backcrossing them with their tall bearded parents, a type of crossing which may be productive of future surprises.

Few intermediates from the new standard dwarfs are yet on the market, but there will soon be improved pinks, blends of various types, plicatas, and self-colorings in blue, yellow, purple, and "red."

The symposium of the Median Iris Society for 1960 showed among the ten best the billowy white 'Cloud Fluff' and its sister 'Blue Asterisk', blue with a deeper pattern in the falls; 'First Lilac', a delightful pale lilac-pink; the bright red-purple 'Florinda'; the prize-winning 'Kiss-Me-Kate', cream with a blue edging on its falls; and 'Pink Debut', first of the tangerine bearded pinks, a break not too perfect in form or clarity of color.

Many of the older intermediates are widely known and grown, but they are usually purple, yellow, or white. Among them are 'Black Hawk', 'Black Magic', 'Ruby Glow', and 'Red Orchid' in the purples; 'Southland' and 'Sangreal' in yellows; 'Ultra', perhaps as blue as any iris; and *albicans*, 'Autumn Queen', and 'Zua' in white. The latter, with crinkled petals, is very popular.

Border Bearded

"The border irises are diploids or tetraploids from fifteen to twenty-eight inches in height, with stiffly erect branched stems and of larger proportions than the miniature tall bearded irises. They bloom with the tall beardeds of which they are the shorter varieties."

The American Iris Society's award for the best border iris of the year was named for Harold Knowlton, a past president of the Society and one of the first to recognize the value of the smaller irises. The Knowlton Award was given for the first time in 1960 and went to 'Yellow Dresden' developed in Utah by Margaret Allbright.

The border irises are not quite so simple a problem as they seem, for although the class includes all tall bearded with shorter stems regardless of flower size, many specialists prefer plants in which the flowers and stems are in proportion. Nonetheless, many gardeners are fond of big flowers whatever the stem length, so the big "shorties" have found their place. So far most of the border irises have been "accidents" in breeding for tall beardeds, but there is now more interest in breeding them with intent.

Some of the older ones are still desirable, and it is unlikely that the best of the old diploid irises will ever fade completely from gardens no matter how they are classed. For one thing, they have a nostalgic charm; for another, they are among the toughest and most persistent of garden perennials. 'Pink Ruffles', a very fine garden and landscape plant, still hovers at the top of lists of choice border irises. It was developed by Kenneth Smith of Staten Island, the well-known hybridizer of honored tall beardeds, and he has been heard to mutter that he is doomed to be remembered for 'Pink Ruffles'. In the familiar yellow and red, 'Gay Hussar' is a favorite with many even in this modern age.

Some of the older tetraploid varieties that are registered as tall beardeds are actually border irises. One of the best

of these is 'Black Forest' which rates high among all irises. 'Buttonhole' is a very charming small yellow iris; 'Paradise Pink', one of the earlier pinks, is widely used for hybridizing as well as being a fine garden plant. And there is still no whiter white than 'Priscilla'.

It is hard to keep pace with the output of new border irises in all the bright new colors and fashionable breaks of the tall bearded. Some that have proved themselves in the Median Iris Society's test gardens are 'Frenchi', a bright rose bitone; 'Chocoleto', a dark brown of fine growth habit at the upper height range of the class; 'Donna D', a flaring broad-petaled white with rather large flowers for its height; 'Yellow Dresden', the lacy yellow that won the first Knowlton award, and its sister, the pink 'Yum-Yum'. Pinks abound in the class because the tall bearded pinks carry factors for shortness: 'Little Gem', 'Border Pink', 'Pink Pixie', and 'Wee Bit' are good. Mildred Brizendine's 'Little Reb' and Cassebeer's 'Sputnik' are both excellent plicatas. 'Primrose Bonnet' is a charming soft yellow, and 'Little Brother' is a browner edition of 'Garnet Royal'.

Miniature Tall Bearded

"The miniature tall bearded or table irises are the smaller diploid tall bearded irises from fifteen to eighteen inches in height with slender flexuous stems and flowers not over three inches in width. They usually bloom with the tall bearded irises."

Hybridizers have not yet succeeded in producing enough new varieties true to the type to warrant a special award by the American Iris Society. They have not found a formula for breeding plants to the exacting specifications set up for the table irises. So far the plants have been smaller editions of the old-fashioned diploid tall bearded irises and have shown none of the modern tall bearded breaks. It might be questioned whether flowers with some of the special features of the modern tall beardeds, such as great width of petal and extreme ruffling or laciness, would be suitable for this class, for which daintiness is a primary requirement.

These flowers were originally selected for arrangements, and here subtleties of color or contrast are more important. However, they are very fine plants, with grace of line and size scaled to small gardens, and they bloom with the tall bearded. They are sometimes grown in the forefront of plantings of tall beardeds, but the competition they present is that of a sixth-grader in a "Miss America" contest.

Actually, the most recent introductions in this class look no more modern than the originally selected group on which the type was based. 'Parakeet' and 'Smarty Pants', for instance, have the same yellow stands and red-lined falls as the species *Iris variegata.* 'Desert Quail' is a neat small plicata, but so is the original 'Widget'. The older ones show some variation—'Nambe' and 'Spring Sprite' have violet-blue in their falls with yellow stands. 'Two for Tea' is a pale orchid; 'Daystar' is a dainty variety with bright reddish beard and almost the airiness of the vesper iris; 'Chewink', 'Tid Bit', and 'Tom Tit' are blues of various depths.

I have not touched on the culture of median irises, for it is the same as for all bearded irises.

Five new Japanese iris of the Marhigo Strain: 'Driven Snow', fully double, white; 'Galatea', flax-blue, sharply penciled white; 'Royal Crown', red and white bicolor with crested white center; 'King's Court', large, beet-red with white veining; 'Veiled Vanity', ruffled white with blue veining.

TODAY'S JAPANESE IRIS

Recent and continuing strides in the development of Japanese iris are making this spectacular perennial one of the most desirable plants for the modern garden. Improvements have been especially notable in the semi-double and double types. Many of the latest originations, because of their curious concentration of petalodes in the flower's center, resemble peonies in form. Others with extreme ruffling and fluting have been likened to large-flowered azaleas.

Branching, once a problem, has now become a rather common trait of the newer sorts. Most of them have two- or three-way branching as a result of hybridizing of well-branched parents. Likewise, a greater clarity of color has been achieved through careful selection of parent varieties and the seedlings that emerge.

Consistent hybridizing and line breeding of American hybrids have yielded a remarkable array of superior colors, forms, and types for the Japanese iris fancier, who may be unaware of the shortcomings of the original strains imported from Japan. Even now, there are colors that elude Japanese iris hybridizers—yellow, orange, and greenish shades. Perhaps "breaks" in these colors are not too distant, if the present rate of progress is maintained.

American hybridizers widely recognized as leading contributors to contemporary Japanese iris are Walter Marx of Boring, Oregon, and W. A. Payne of Terre Haute, Indiana.

Walter Marx, developer of the Marhigo Strain of Japanese iris, has succeeded admirably in his endeavor to create general standards of nomenclature for Japanese and other iris now available. The Marhigo Strain is registered in compliance with the American Iris Society's program to assure the accuracy and non-duplication of iris names. The early registrations were limited yearly to ten varieties of any one grower's originations in all iris classifications, but this limit was raised in 1959 to forty, permitting a large backlog of varieties to be registered.

Fourteen new registered Marhigo iris are being introduced for 1961 by Walter Marx Gardens. Each is a distinct advance in its color class, and Mr. Marx believes that some will set the standard for a number of years.

A most careful selection and crossing program has also been pursued by Mr. Payne, who rigidly sets his standards for introductions from a reported annual seedling crop of about eight thousand.

New seedlings are produced, as with the different types of bearded iris, by cross-pollination and planting of seeds from hand-pollinated blooms.

Proper culture is particularly important and rewarding in growing Japanese iris. They require an acid soil similar to that for azaleas and rhododendrons. Lime is harmful; if present in the soil, the leaves will begin to turn yellow, indicating that the plants should be moved to another location.

To counteract alkalinity, one may add sulphate of ammonia, peat moss, or oak leafmold. It is also beneficial to prepare the soil with any well-rotted manure or acid-base commercial fertilizer. The crowns should be set about two inches below the ground level in planting. Moderate moisture is sufficient until the blooming period approaches, when these irises require abundant moisture. While they are blooming, it is almost impossible to supply too much water, provided the soil has normally good drainage.

First-year flowers are seldom of true quality; usually a full year is required for the plants to become well enough established to produce any blooms at all. Propagation is by division of the root clump. O.A.R.

SOIL FERTILITY — A CORNERSTONE OF SUCCESSFUL GARDENING

By F. J. KNOCKE

Dr. Knocke pursues his hobby of gardening whenever his duties as orthopedic surgeon and Assistant Medical Director of the Hunterdon Medical Center in New Jersey permit him to do so. He has been interested in dahlias for thirty-two years—knew the late Dr. Marshall Howe of The New York Botanical Garden and compared notes on dahlias with him. Within recent years Dr. Knocke has developed a lively interest in iris. Members of the American Iris Society will visit his garden during the four-day annual meeting to be held in Region 19, May 25-29, 1961.

FEW GARDENERS are fortunate enough to belong to a family whose two hobbies supplement each other as well as ours do. My wife and daughters ride horses, and I grow flowers, especially irises and dahlias.

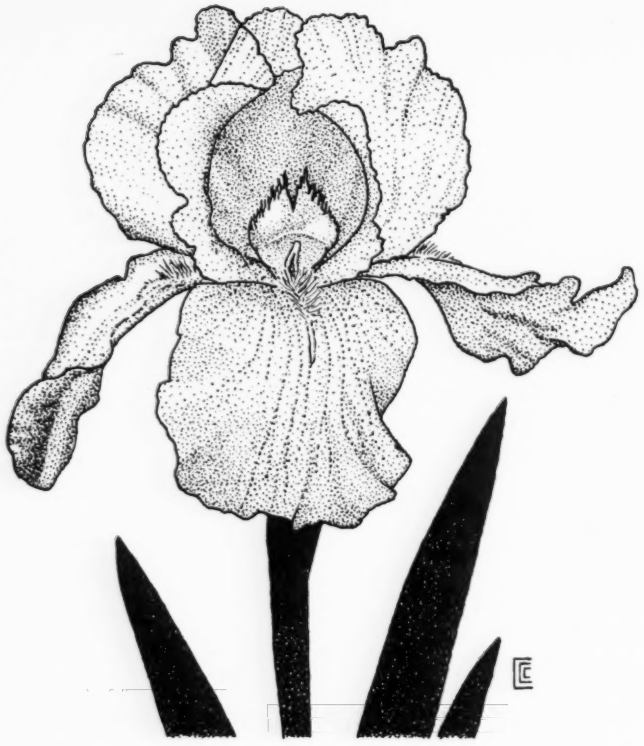
Seven years ago we moved from the Bronx, New York City, where for twenty-five years I grew dahlias for show in a small back yard, to an eighty-acre farm in the rolling hills of Hunterdon County in western New Jersey. Here our hobbies are primarily limited by time—not by space as previously.

Six horses contribute to the fertility of the acre that is used for horticultural purposes. In keeping with the practices of the neighboring dairy farmers, the manure is spread directly on the fields in winter and plowed in when the ground becomes workable in the spring. Because of heavy application, up to six inches deep, the straw tends to clog the plow, so the area is rototilled first, and then plowed. During the summer the manure is composted, along with all organic garden wastes, and this material is then turned in the following fall or spring.

The result of this heavy application of organic material has been to increase the friability of the shale soil, and to increase the depth of the topsoil on the solid shale base. The soil now adsorbs water more quickly and holds it longer, but it does not get muddy and can be cultivated sooner after heavy rain or watering. In appearance it is darker in color—it looks "fertile."

All available organic material is incorporated in the soil, the more the better. In addition, chemical fertilizers are used in concentrated applications. For the dahlias and gladiolus, up to two tons of 5-10-10 fertilizer per acre are incorporated with a rototiller in four or five applications through the growing season. Extra phosphate is also used during early growth. This is applied as superphosphate or bonemeal, two or three hundred pounds per acre. Just before the blooming period extra nitrate is added, usually in the form of calcium nitrate solution (fifty pounds of the chemical per acre). To increase root production extra potash may be added, usually wood ashes from the fireplace. The organic material in the soil adsorbs these fertilizers and releases them slowly. It acts as a sponge or buffer.

The chemical fertilizers are applied not only to provide nutrients directly to the plants, but to "feed the soil," that is to feed the microorganisms that are composting the organic material in the soil. As a result of microorganic activities, the chemical fertilizers are "bound" and then



released gradually, so that they are continuously available to the plants.

This program has resulted in vigorous plant growth and fine flowers. However, a few words of caution are indicated. Too high an application of nitrogen produces extra-sized flowers which are soft and do not last so well as those that are not forced. The roots of plants so forced are also soft and do not keep well in storage or winter well in the ground. Moreover, heavy applications of chemical fertilizers must be watered well to render them soluble so that they can be used by plants and microorganisms. When chemical fertilizers are applied on top of fertilizers not yet dissolved, tender roots are burned and plants wilt.

The program that has been outlined of using organic material in the soil is a general one. It must be varied to meet the needs of different plants.

Dahlias, irises, gladiolus, and peonies are the plants that I grow. They all have fleshy roots, so I am careful that the manure is well composted before it comes in contact with the roots. This is especially important for the irises and peonies. No fresh manure is added to the soil in which they are to be grown for six months or a year before planting. Water and fertilizer are withheld from the iris for two months after they have bloomed—during the dormant or resting phase.

There are, of course, certain disadvantages in using manure. One is that the composting, spreading, and mechanical dispersion and incorporation in the soil are heavy work and take time and expensive equipment if done on a large scale. Weed seeds are spread, and additional cultivating is required. If the manure is not well composted before it comes in contact with roots, it increases the possibility of the development of rot. And then there is the odor; in a small area this can be overcome by covering the compost heap with soil. If a free source is not available nearby, manure may be expensive to purchase and transport.

In spite of these disadvantages, and if the gardener is willing to expend the time, work, and money to overcome them, soil fertility can be improved and maintained by the liberal use of manure. I for one think it is well worth the effort.

With the addition of organic compost (manure when available) the fertility and productivity of our plot in New York City increased each year. When the time came to sell the property, the purchaser confided after the sale that it was the wonderful soil in the garden more than any other one factor that influenced her to buy the house.

Soil fertility is the cornerstone of successful gardening. Pedigreed stock and skillful care after planting are wasted if the seeds "fell on stony ground." Personally I derive much pleasure from improving the soil in my garden. Preparation before planting, cultivating, watering, and fertilizing, all are easier to do and more effectively accomplished with a granular, porous yet retentive, fertile soil. I enjoy growing flowers, displaying them in the garden, giving them to friends, exhibiting them at flower shows, but I also enjoy working with the soil in the garden, and I derive much satisfaction in seeing it improve from year to year.

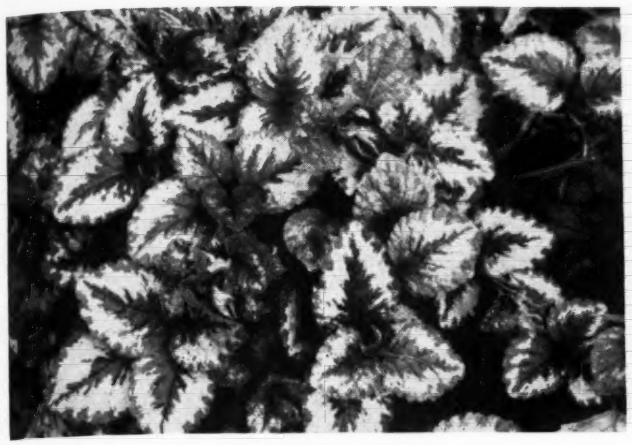
NOTEWORTHY HERBACEOUS PERENNIALS

By ANDRE VIETTE

Mr. Viette, a horticulturist, is Manager of the Martin Viette Nurseries at East Norwich, Long Island, lecturer, and writer on perennials in which he is especially interested.

MANY NOTEWORTHY hardy perennial plants are adaptable to a wide range of soils, are relatively free from insect pests and diseases, and require little care. A perennial plant must be able to flourish in different soils—sandy, loamey, or clayey—varied in organic content and structure to be a useful plant for the gardening public. It must have the stamina to thrive for many years after the initial soil preparation and planting have been completed. It must be able to survive the rigors of a hot dry summer and a fluctuating winter. Perennials that have few insect and disease problems are in demand, because today's suburbanites do not relish a weekly spray ritual; they prefer to use their leisure to enjoy their gardens.

Artemisia albula 'Silver Queen' has wider leaves and a bushier habit but is similar in other respects to *A. albula* 'Silver King'. Its cream-colored racemes are not showy; 'Silver Queen' is used mainly for its beautiful gray foliage. This plant is relatively free from insects and diseases. It



Lamium galeodolon variegatum

grows four feet high. It thrives in full sun and tolerates sandy as well as clayey soils. Propagation is by division in early spring or early fall or by terminal cuttings taken in June.

Heliopsis scabra is a fine summer-flowering perennial and lasts long as a cut flower. It should be grown in full sun, as it elongates excessively and becomes straggly in light shade. *H. scabra incomparabilis* has brilliant golden semi-double flowers and grows to a height of thirty-eight inches. It has one of the longest flowering periods of any perennial, commencing June 15 and continuing until October. 'Gold Feathers' and 'Goldranunkel' are two improved cultivars which will find an important place in the gardens of America. Some pathogens and insects have been reported to attack *H. scabra* in this country and Europe; but aphis, which infest the terminal growing portion of the plant, are the only pests that may necessitate spraying. Division in early spring or early fall or tip cuttings taken in late May are the means of increasing stock of a particular cultivar. Although heliopsis grows well in varied soils, it does best in a rich, well-drained loam.

The hemerocallis or day-lily is considered to be the perfect perennial, as it will grow in sun or shade, wet or dry situations, heavy or light soil, and requires little care. It is long-lived and relatively free from insect pests and diseases. Some years thrips bother buds and flowers.

As most hemerocallis cultivars meet the requirements for garden-worthy perennials, I can be critical in evaluating and selecting the best. 'Star Dream' ('Vespers' × 'Bountiful' —P. J. Tass) in this area has excellent branching. It blooms for a long period (July 15-August 10) with many flowers opening each day. All the flowers are displayed individually without being crowded. Its sturdy stems withstand wind and rain. 'Star Dream' has proved durable under adverse weather—even during spells of excessive heat, the petals retain their substance and brilliant pigmentation. This pale yellow, very fragrant hemerocallis opens at five o'clock in the morning and lasts well into the evening. It increases rapidly in size, is easily propagated, and has few insect pests and diseases. Although it does not have the largest flower and its form is not the most perfect of the cultivars, I consider 'Star Dream' one of the best of the new introductions because of its prolific blooming and durable growing habits.

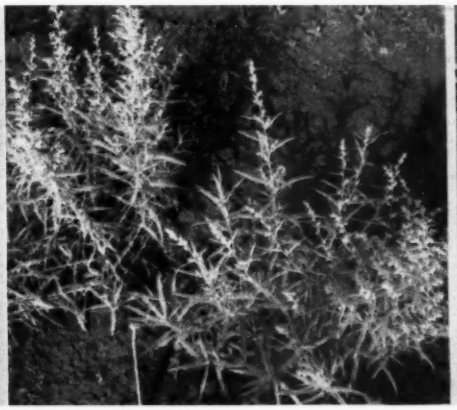
One of the finest groundcovers that has come to my attention is *Lamium galeodolon variegatum.* It is not a well-known plant. Its extremely rampant growth lends itself well to use on steep inclines and large areas in need of covering. Because of its rapid spreading habit, it should be confined in the garden by metal edging and should not be planted where it will encroach on other perennials. *L. galeodolon variegatum* is one of the few plants that has true silver markings rather than the usual yellow and white. It carries short heavy racemes of pale yellow during June. It grows in full sun as well as light shade, flourishes in soil rich in organic matter, and is propagated by division, runners, or vegetative cuttings taken in July.

Lysimachia clethroides spreads vigorously and should be given plenty of space. It is especially adapted to naturalistic planting. *L. clethroides* grows thirty inches high, is tipped with four-to-six-inch curved spikes of white florets from the first of June to the first of August. It is a very good cut flower and has lasted for two weeks in an outdoor display in the shade. It grows well in any soil, even tolerating an excessively wet location, and is propagated by division in early spring or early fall.

Phlox paniculata is an exceptional perennial because of its remarkably long periods of bloom. Flowering begins about July 1 and, after a dormant period from August 20 to September 10, resumes and continues through October. Clipping old flower-heads is not necessary, since flower buds are initiated in the old seed-heads and will produce panicles similar to the original ones. For more desirable

Tradescantia virginiana 'Valour'

Artemisia albula 'Silver Queen'



Rudbeckia fulgida 'Goldsturm'

Above. *Lysimachia clethroides*

Right. *Heliopsis scabra incomparabilis*

effects the heads can be sheared after the first flowering; this will induce lateral buds below the cut and result in a flatter, wider inflorescence for the second blooming. Another advantage in shearing is the removal of seed before they fall to the ground, germinate, and develop into seedlings of undesirable reverted types.

New growth in the spring may be sheared when it is from eight to fifteen inches high, and this will promote a shorter plant of bushier habit and a flatter inflorescence. *Phlox paniculata* flourishes in a moist, well-drained, rich loam in which has been incorporated a substantial amount of organic material. It responds very well to peat moss.

The commercial technique in propagating this phlox is to take root cuttings and plant them upright in a peaty soil with a one-inch covering of the peat-soil medium during October and November. The bed is covered with twelve inches of leaves for the winter, during which a callus is formed at the end of the root cutting. In early spring the mulch is removed, and the callus differentiates into stem. The cuttings develop into small plants which mature about the first of June and are then ready for planting out in the field. Terminal cuttings may also be taken in May and June; when rooted, they are planted in the field. If small quantities are desired, propagation by division in early spring or mid-fall may be less arduous.

Phlox paniculata will tolerate light shade, but in full sun growth is shorter, stems are sturdier, and flowers are more abundant. It has one major drawback—it requires spraying at three-week intervals from May through September. Fungi cause leaf spots which appear first on the lower leaves and gradually spread to the top of the plant; the leaves eventually shrivel and die. The fungicide "Captan" gives adequate control. During cool moist periods powdery mildew—a whitish mold on the surface of the leaf—retards some physiological processes but the chief trouble from this disease is the impairment of the beauty of the plant. I have found "Acti-dione P. M." to give effective control. Probably the worst problem with *P. paniculata* is the stippling of the upper surface of the leaves from the feeding of the minute two-spotted mite. This may be severe during summer but can be effectively controlled with "Kelthane." By applying the proper chemicals at the appropriate times, the gardener can reduce attacks from insects and disease to a minimum.

There are over a hundred cultivars of *Phlox paniculata*. The following are among the superior ones. 'Brigadier' has brilliant salmon-orange flowers and grows four feet tall. 'Bornimer Nachsommer' is an extremely sturdy plant with beautiful large panicles of pale salmon-pink—it is one of the best recent introductions. 'Elizabeth Arden', a medium-short phlox, is a prolific bloomer; its pale pink flowers have a lavender tint. 'Mia Ruys' because of its compact, bushy habit, is becoming quite popular; its flowers are white. 'Prince George' is a strong, durable phlox with vivid red-salmon flowers. 'Progress', another robust cultivar, has huge lavender-blue blooms with deeper eyes. 'Starfire' is without doubt the finest deep red phlox to date because of the brilliance of its color. 'World Peace' carries its clear white inflorescence on very strong, tall stems.

Rudbeckia fulgida 'Goldsturm', with deep yellow flowers, three and a half inches across, blooms profusely and continually from June 25 to October 15. A compact plant, rarely taller than twenty-six inches, 'Goldstrum' does not spread through the garden. It will tolerate the hottest position in full sun and thrive in many kinds of soil. I have not yet encountered any insect pest or disease that requires spraying. *R. fulgida* 'Goldsturm' is propagated by division in April, May, and October.

The new hybrid *Tradescantia virginiana* 'Valour' has large, deep purple-red flowers which, as with most tradescantias, last only until two o'clock in the afternoon. It flowers from July 15 to October 15, grows well in full sun or light shade and in a wide range of soils, and has few insect or disease problems. It is propagated by division.

SPRING GARDEN PARTY CANCELED

We regret that it has been found necessary to cancel the Spring Garden Party on May 17, 1961. The rehabilitation of the Museum and Administration Building has taken longer than anticipated, and facilities are not available for the programs planned for this event.

CHRYSANTHEMUMS FOR THE CONNOISSEUR

By CORNELIUS ACKERSON

Mr. Ackerson is past president of the National Chrysanthemum Society Inc., U. S. A., a member of its Board of Directors and Editor of its publications. He is the author of *The Complete Book of Chrysanthemums* and maintains an active interest in many phases of horticulture.

MANY PLANTS will grow from seeds to bloom in a few months with very little care. This is, of course, a fortunate situation for the lazy gardener, since he labors little and profits much, but having put little of himself into his garden, he cannot claim the credit for the floral results which rightfully belongs to a bountiful nature. With chrysanthemums, roses, lilies, and other favorite flowers, the gardener's care shows up in the final results, for without "tender loving care" the blooms are mediocre.

In floral evolution the composite family, of which *Chrysanthemum* is an important generic branch, represents the most recent major development. Yet the continuous hybridization of this genus reaches back over twenty-five hundred years, a record not exceeded by any other ornamental plant. While lilies, roses, and other ornamentals have been hybridized periodically by a few for the enjoyment of many, chrysanthemums have been hybridized by amateurs in their own gardens as well as by professional growers throughout the world. It is relatively easy to cross two chrysanthemums, and the resultant seeds will produce blooming plants the first year if sown early. This has led to the development, from the small daisy-like species native to the Orient, to fifteen distinct classifications of flowers which are recognized by the National Chrysanthemum Society Inc., U. S. A. In addition, the Japanese growers have developed several bizarre forms of blooms that are not generally grown elsewhere. The average gardener recognizes the single and small double bloom forms as garden "mums," but he invariably thinks of the large blooms displayed in florists' windows as special kinds which can be grown only in greenhouses by experienced gardeners. Many an average gardener has, however, learned the simple rules for growing these exotic blooms in his garden. They demand a cultural schedule that requires more time and effort than are required to grow annuals, but the results are far more satisfying.

Before the age of printed history, Chinese chrysanthemum growers had developed large globular-shaped blooms with each floret arranged in a vertically incurved position to enhance the circular symmetry. Excellent examples of these Class 6 blooms are shown in the foreground and upper left of the illustration on page 86.

When Japanese gardeners acquired plants from the mainland, they grew them with such zeal that the chrysanthemum soon became the national flower of Japan.

They embarked upon a hybridizing program which exploited the irregularity of floret arrangement that the Chinese growers had tried so hard to eliminate, and they rejected the symmetry that the Chinese growers had so painstakingly developed in their blooms. The subject of chrysanthemum hybridization is so complex that it cannot be covered in this article; for those who wish to learn about it the National Chrysanthemum Society has published *The Breeder's Handbook.**

By nature, the chrysanthemum is a composite flower. The description fits a flower-head that has a central disc of flowers containing a complete set of reproductive parts, stamens and pistils, and is surrounded by one or more rows of ray, or ligulate, flowers which have only the female reproductive parts, pistils. There are two types of florets in every chrysanthemum bloom. If the central disc-florets have been developed through hybridization, and the ligulate florets remain as in a daisy, the bloom is a Class 3 or Class 4 anemone-type. On the other hand, if the ray-florets have been developed while the disc-florets remain inconspicuous, the bloom is either a Class 6 regular incurve or a Class 7 irregular incurve.

The Japanese hybridizers grasped every opportunity to accentuate both the predominantly disc-floret type and the irregular ray-floret type. In developing blooms that accentuated the ligulate florets at the expense of the disc-florets, the Japanese produced some in which the ligulate florets remained closed. Here again it is necessary to explain that hybridization by thousands of gardeners over hundreds of years can produce variations that are difficult to correlate into a standard classification. However, if the ray-florets surrounding the disc remain straight and closed, the bloom is a quill, Class 13; if they are hooked and coiled, they produce a spider, Class 15; and if they remain short and open at the tips like a spatula, the blooms are spoons, Class 12.

The basic culture for chrysanthemums is common to both the hardy garden types and the larger bloom types. Before discussing the special requirements for exhibition-quality blooms, I shall summarize basic chrysanthemum culture:

1. Plant rooted cuttings from your own stock or cuttings purchased from a reliable nursery outdoors after all danger of frost has passed in your particular area. The blooming date does not change with the time of planting, but larger plants are developed from early planting. The best time for any area is one that permits the plants to become established before the heat of summer. Be sure the location receives full sun for most of the day.

2. When the plants are approximately six inches high and making good growth, remove the top half-inch of terminal growth. This is called pinching, and it induces the plant to branch. Pinching of lateral shoots up to August 1 will develop bushy plants which will bear many flowers. Small cushion-type mums are self-branching.

3. Chrysanthemums are shallow-rooted plants, and they require considerable moisture for best results. A mulch of peat moss or other organic material will conserve moisture in the top layer of soil and keep down weeds. The mulch

*This may be obtained from the Secretary, Miss Dorothy P. Tuthill, 345 Milton Road, Rye, N. Y., for $1.50.

should be applied when the plants are small.

4. All good gardeners start with a well-prepared bed which is rich in organic matter. Fast-growing annuals may not require further feeding, but chrysanthemums need extra food to produce maximum results. Start feeding in July on a biweekly basis with a balanced fertilizer. Remember that little and often is the rule. Stop feeding as soon as the buds show color.

5. Prevention of insect and disease infestation is a "must" for good results. Apply a combination spray containing malathion and captan on a biweekly schedule, and at the first opportunity after a heavy rain.

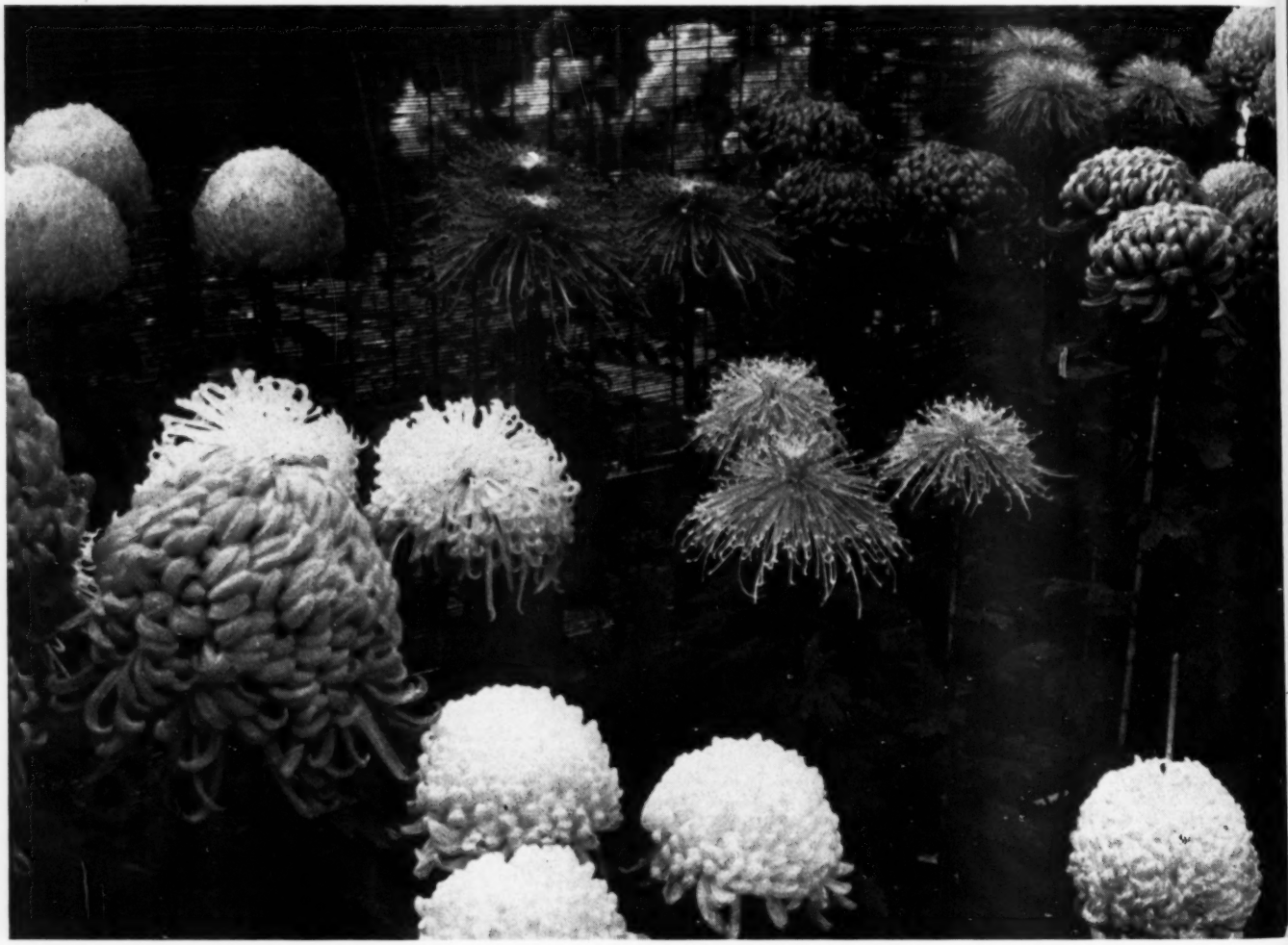
6. After the plants have bloomed, cut them to within three inches of the ground and burn or otherwise destroy all stems and foliage. After the ground has frozen, cover the plants with salt hay or some other loose organic mulch. Chrysanthemums are relatively hardy, but their shallow roots are injured by too much moisture around them during the winter and the heaving of the ground in alternate periods of freezing and thawing. Some growers dig up the plants and store them over winter in a coldframe. Whatever you do, be sure the plants are properly labeled and, as an added precaution, make a scaled drawing that locates each variety.

A mass of flowers on well-proportioned plants should be the aim of the gardener who grows chrysanthemums for landscape effect.

The connoisseur who desires large spectacular blooms must direct his efforts so that each one of his plants will produce only one, two, or at the most three blooms. He will start with rooted cuttings and plant them twelve inches apart in rows that are a minimum of twelve inches apart. For ease in handling the plants, he will allow a path every four rows so that plants in two rows can be reached from a path.

Depending upon the planting date, large-bloom plants will grow to an ultimate height of six or more feet so that a positive method of support is required. A gardener who has only a few plants may find quarter-inch steel stakes or bamboo stakes adequate, but it is difficult to get stakes of the proper length. After partial success with several methods, I devised the ideal system that meets all requirements. I have one wire stretched tightly along each row at a height of six inches and a second tight wire at a height of eight feet directly above. I tie a piece of mason's twine between the wires at each plant. I find that a simple over-and-under tie, with the loose end doubled over to make one half of a bow knot is best, since a pull on the free end will release the twine from the wires. It is neces-

An excellent grouping of pot-grown chrysanthemums in a Japanese garden. In the left foreground is 'Taiho Bizan', twenty inches in diameter, and an example of irregular incurve, Class 7.



sary to tie all the twine in a given row with the same degree of tension to give uniform support.

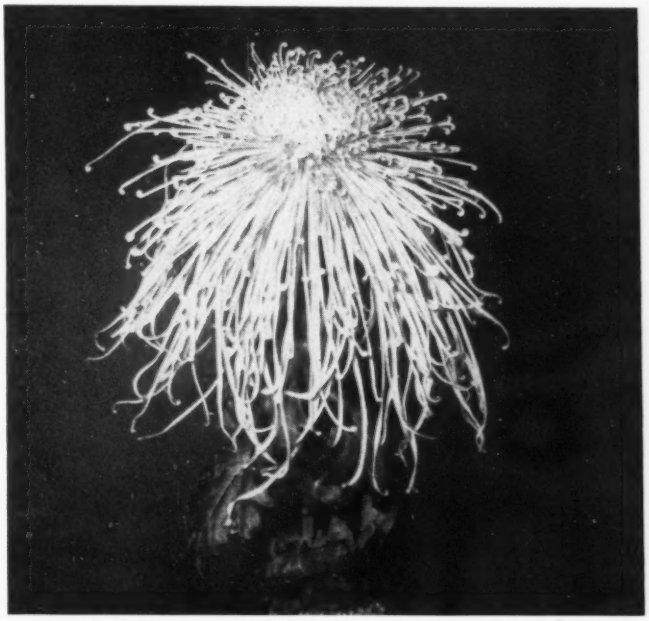
The first pinch is made just as it is with bush type plants, and usually three lateral branches will develop. When these are an inch or so in length, the best in vigor and angle from the vertical is retained; the others are carefully removed. Only one additional pinch is made, but this so-called *time-pinch* is so important that it will be necessary to delve into the peculiar blooming habit of the chrysanthemum before any instruction can be given on the time to make the second pinch.

A typical, irregular or Japanese incurve bloom, Class 7.

All chrysanthemums if allowed to grow naturally will develop a bud in the terminal growth of the plant, usually in June on plants that have been set out in May. This is the *break bud,* and it never becomes much larger than a pinhead. Lateral branches are formed below this bud and continue the upward growth of the plant. Approximately a month later a second bud will form in the terminus of each branch. This is the *first crown bud,* and it too will cause branches to develop from a point directly below it. The process may be repeated again on plants that have had an early start. Any *crown bud* can be made to flower if all the buds of incipient branches around it are removed. However, the chrysanthemum has a remarkable built-in-bloom-timing system which will delay flower production until the normal time for a particular cultivar. A crown bud which is forced to wait in the hot August weather of metropolitan New York will surely be well "cooked" by October.

Finally, as the weather turns cool, a larger bud is formed in the terminal growth of each branch. This is called the *terminal bud,* since it is the last in the series of buds which have been produced. Unlike the crown buds which have a potential flowering bud in the center surrounded by vegetative buds, all the buds surrounding the central terminal bud will bloom. Obviously a lot is left to chance if the plants are permitted to grow naturally. Also there will be a lot of crowded blooms instead of the one perfect specimen that a grower can produce on each stem.

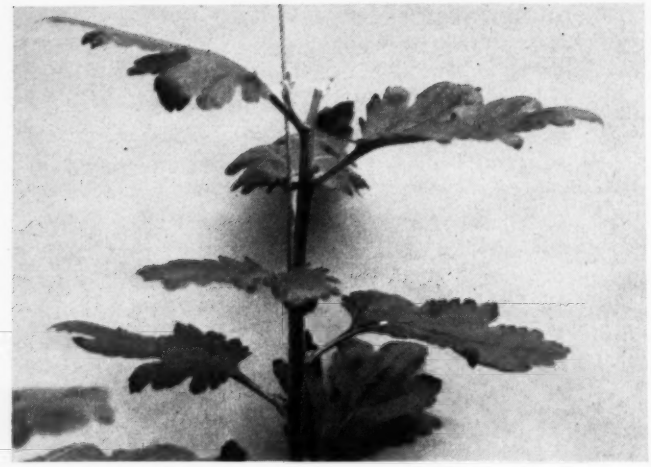
It would seem as though the chrysanthemum puts forth its sequence of buds to probe for favorable blooming conditions just as a mariner does who holds a moistened finger aloft to test the wind direction. Actually the process by which the chrysanthemum produces crown or terminal buds is still a mystery, but we do know that length of day controls the date of blooming. When the hours of darkness begin to exceed those of daylight, chrysanthemum plants begin to form terminal buds. This period begins about August 15 in the latitude of New York. Some cultivars take only six or seven weeks of short days, while others require up to fifteen weeks to go from vegetative growth to blooming. Commercial growers have developed a grouping system which places each cultivar in a six- to fifteen-week category in accordance with its short-day require-



The exotic spider or Fuji type of bloom that is designated Class 15 by the National Chrysanthemum Society, Inc., U. S. A.

ments. Thus most of the early-blooming hardy garden 'mums' are in the six- or seven-week group. The larger blooms that the connoisseur would grow are in the nine- and ten-week category.

Now that we understand the method by which each chrysanthemum cultivar is induced to bloom at approximately the same time each year, we can fit the culture to the pattern. After the plants are making good growth on the one stem that we permit to develop from the first pinch, we know that nature will produce a crown bud. However, if we beat nature by making a pinch at the right time, we shall produce branches which will make uninterrupted growth until a terminal bud is formed. We know that our nine- or ten-week plants will begin to receive the short-day influence about August 15, and they will then bloom the last week in October or the first week of November. We should make the time-pinch long enough be-



Above. Bud development from a time-pinch. Note the plastic-twist tie to hold the plant to its support.

Right. 'Detroit News', a late crown-bloom of exhibition quality.

fore August 15 so that the resulting flowering stems will be ready for the short-day treatment. On the other hand, we must not make the pinch too early or a crown bud will form. In that case we either remove all the side buds and hope for a good bloom, or we allow one lateral to grow on to become a short-stemmed terminal bloom. Experience indicates that the time-pinch should be made approximately ninety to one hundred days before the normal blooming date of a given cultivar. This will produce a late crown or a terminal bud.

Generally speaking, the blooms from a crown bud have more florets, but they may not have the best color; while blooms from a terminal bud may lack full form from fewer florets, but the color is more intense. The connoisseur should try to make his time-pinch so that a late crown bud is formed. A one-hundred-day pinch is more apt to produce a crown bud than a ninety-day pinch. The crown bloom will have a few short bracts in place of true leaves directly below the flower-head: these may be seen in the illustration on page 88. Two branches are developing from the time-pinch made on the plant pictured on page 88. The one on the right departs from the vertical stem at a better angle than the one on the left, so it will be retained.

In all but the higher areas around the mid-Atlantic seaboard a frost usually occurs about the end of October, and this is generally followed by a warmer period which lasts well into November. Since the greatest number of large-bloom chrysanthemum cultivars flower at this time, many growers take their chance on the weather and hope that frost will not damage their blooms. It is not so much cold weather that causes the damage as it is the effect of the sun's rays on frost-encrusted blooms. White petals are affected more than bronze or red ones. The plants will stand a low of 28° F, provided they have overhead protection. Such temporary protection as sheets or newspapers may be used if there are only a few plants.

The plastic cover is being installed in mid-October over the pipe-support frame.

These blooms approach maturity under the plastic cover in November.

SOME OUTSTANDING CULTIVARS FOR THE CHRYSANTHEMUM CONNOISSEUR

NAME	NCS CLASS	COLOR	BLOOMING DATE	REMARKS
'Silver Sheen'	6	White	October 20	A good early white
'Mrs. Kidder'	6	Yellow	October 20	An old favorite
'Roseum'	6	Pink	November 1	Excellent incurve
'Amber Bright'	6	Bronze	October 15	An English import
'Zylon'	6	Red	October 25	Rich color
'Pale Moon'	7	White	November 1	Creamy white
'Oriole'	7	Yellow	November 1	A great exhibition bloom
'Rose Bowl'	7	Pink	November 5	Deep orchid-pink
'Chambrier'	7	Bronze	October 20	A new gem
'Muto's Crimson'	7	Red	November 5	Gold reverse on petals
'Dunlop's White Spider'	15	White	November 1	Stiff stems, large blooms
'Luyona'	15	Yellow	October 25	Best yellow spider
'Bunbu'	15	Pink	November 1	A constant NCS winner
'Waikiki'	15	Bronze	November 5	Delicate shading to orange
'Emerald Isle'	15	Greenish	November 8	Most unusual

The connoisseur, however, will not run the risk of having his summer-long efforts wasted in one night. He plans ahead for protection that can be easily put up in advance and removed at the end of the season. My twenty- by forty-foot chrysanthemum area presented a protection problem which I solved by using a relatively heavy gauge plastic covering over a pipe-support frame set in concrete posts. The newer types of outdoor plastic materials make excellent frost covers, provided the roof is kept taut to prevent water-collecting pockets. I have found that the weight of a piece of 2 × 4 lumber attached to each edge will keep the top tight. It is advisable to have a hem large enough to slide in a piece of 2 × 4 on each side; this hem can be made by a heat-seal process at the factory.**

The hobby of growing chrysanthemums is most rewarding, for there are so many possibilities for cultural exploration. Chrysanthemums may be grown in pots to produce large specimen plants or cascades; they may be shaded with black cloth to induce earlier blooms; they may be grown under lights in a greenhouse to inhibit bud initiation. An avid interest in chrysanthemums may be satisfied by joining with other hobbyists in one of the chapters of the National Chrysanthemum Society in the metropolitan area. This year the Society's annual meeting and show will be held at Garden City, Long Island, on October 20-22, with the Long Island Chrysanthemum Society as the host chapter.

**The X. S. Smith Co. Box 272, Red Bank, New Jersey, will supply plastic covers made to measurement at reasonable prices.

A COUNTRY HOUSEWIFE'S GARDEN

By GERTRUDE B. FOSTER

Mrs. Foster is Editor of *The Herb Growers' Magazine.*

"A ROSE is a rose is a rose," is not always a rose, nor does a rose by any other name always smell as sweet —not, at least, when it is a salad burnet or another herb of the *Rosaceae* or rose family. However, lack of petals, the glory of the familiar rose, and lack of sweet perfume do not diminish our fondness for two very different members of the rose family with time-honored herbal significance. Only a taxonomist or botanist can recognize the relationship of the lowly burnet, *Sanguisorba minor*, the decorative ladys-mantle, *Alchemilla vulgaris,* and the stately bush rose. But the herb gardener, when told of their kinship to the rose, can better understand the need of both plants for excellent drainage and loose soil in which the string-like roots can reach deeply for underground moisture.

The leaves of salad burnet look as if they had been snipped along the edges. They stand out from the stem, the leaflets in a pinnate pattern recalling some of the small-leaved roses; but they grow in thick rosettes close to the ground on stems that are not at all woody. If the plants are started anew each year from seed, the desired cucumber flavor in the leaves, which gives the plant its name salad burnet, is more delicate. Second-year plants have a slight green tang which is not quite so pleasant in tossed salad or steeped in vinegar as is the cool savor of young *Sanguisorba* foliage.

The flowers of burnet are sometimes called "knobs" in English recipes, and this is a very descriptive term. They are in thimble-shaped heads of petal-less blooms which have a rosy color because of the closely-placed, brushy stigmas. The yellow-tipped anthers hang below the thimbles like knotted threads, and it seems as if the stigmas must depend on the wind to fertilize them. No special scent attracts insects, and the upper female flowers are out of reach of the drooping capillary filaments; but many curiously shaped, pitted brown achenes (one-seeded fruits) form upon the airy, long-stemmed heads that stand half a foot above the original rosettes. The blossoms are cut back by the salad fancier to promote the growth of cucumber-like greens; but in England they are allowed to develop and are gathered to make burnet wine, which is described as "the most agreeable to the palate and of a rich ruby colour, tasting like good port wine." If they were gathered as soon as flowering started, the cook could have both burnet wine and burnet vinegar, too.

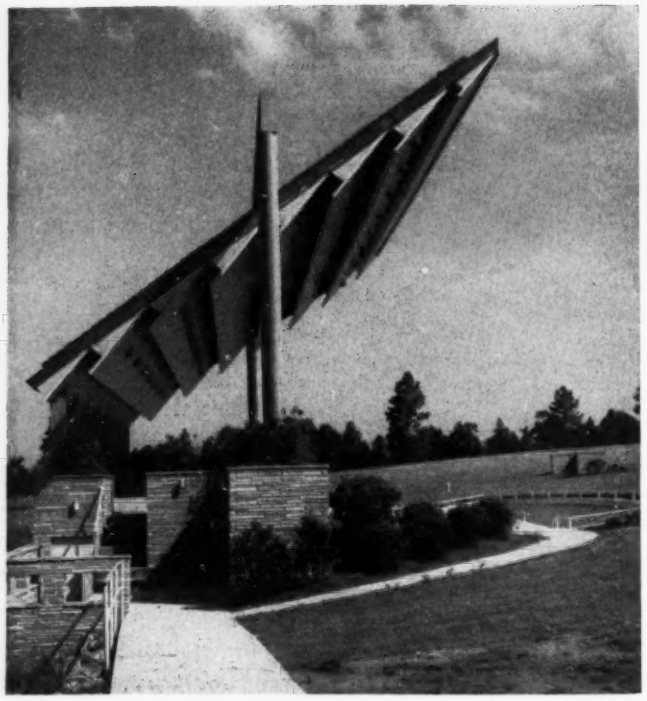
Salad burnet is not a very long-lived plant in my garden;

(Continued on page 103)

GARDEN IN THE FOREST

By C. B. Byrd

Mr. Byrd is manager of Hodges Gardens, one of America's new show places and part of the transformation of western Louisiana.



This modern lake-shore stage was formally dedicated in May 1960, during the height of the rose season, with a twilight concert featuring the Centenary College Choir and the Shreveport Symphony Orchestra.

TWENTY YEARS AGO, I should have thought west Louisiana the last place in the world where I should see plantations of azaleas, camellia trails stretching through tall pines, and thousands of roses blooming beside a lake. The entire region then was an economic cemetery in the wake of the "cut-out, get-out" era of the lumber industry that had clear-cut pinelands to fill worldwide demand for Louisiana virgin pine.

Because there seemed no hope for this repressed area, most young men moved on to cities for work. I should probably have done the same if I had not become aware of the new type of men moving into the region—forest landowners determined to reforest idle acres. I decided to cast my lot with those who wanted to restore the land.

Today, a new forest covers many of the once denuded acres. Highways are busy with commerce as trucks carry timber and pulp to market. Thousands of motorists are attracted here to enjoy plantations of flowers and historic lore. It has been a rare experience to watch a land come "From feast to famine and back again."

The most dramatic outgrowth of reforestation in west Louisiana is Hodges Gardens, Experimental Area and Wildlife Refuge. This conservation area of forty-seven hundred acres is located on Highway 171, midway between Many and Leesville, Louisiana, and is in the center of the rejuvenated pinelands. The land on which Hodges Gardens is located was purchased with other tracts some twenty years ago by the A. J. Hodges Industries of Shreveport, Louisiana. It lay half in the so-called longleaf pine *(Pinus palustris)* belt, then covered largely by worthless scrub oak thickets, and half in the loblolly *(P. taeda)* and shortleaf pine *(P. echinata)* hardwood area, the latter species coming back in second growth.

Obviously reforestation was the immediate need, so a long-range planting program was started. As work progressed, it occurred to us that something should be done to improve the native pine trees by hybridizing and by selective cutting to weed out inferior trees, so that in time the quality of the entire stand would be better. This kind of upgrading had been realized in animal and other plant life, and we felt it could be accomplished with pine trees.

These observations, of course, were not original. After discussions with Dr. Phillip Wakeley of the Southern Forest Experiment Station in New Orleans and with Dr. Bruce Zobel, who was then with the Texas Forest Service, College Station, Texas, we formulated a constructive plan, and the experimental phase of the Gardens was started. A rugged area of the pine plantations was chosen for the experimental work. It was then we noticed the natural beauty of the area, and the idea for the "Garden In The Forest" was born. Approximately one thousand acres were set aside for an experimental area and gardens. It seemed natural to provide a haven for all phases of native wildlife; thus started what is now Hodges Gardens, Experimental Area and Wildlife Refuge.

Nearly twelve years of thought and planning have gone into Hodges Gardens. The main Gardens lie in the center of what was once an old quarry. The trams that were constructed more than fifty years ago to haul out rocks were logical locations for walks. Steps were laid where one would want to walk from one level to another. Falls were built where heavy rain-water drained. An old swimming hole became a reflection pool.

Little of the rugged terrain was changed. The piles of rock, now covered with a green veil of mosses and lichens, still rest where they were abandoned more than half a century ago. The stately trees now pushing up through the massive rocks grew from seeds which were blown from nearby trees and scattered over mounds of broken stone which were never hauled away.

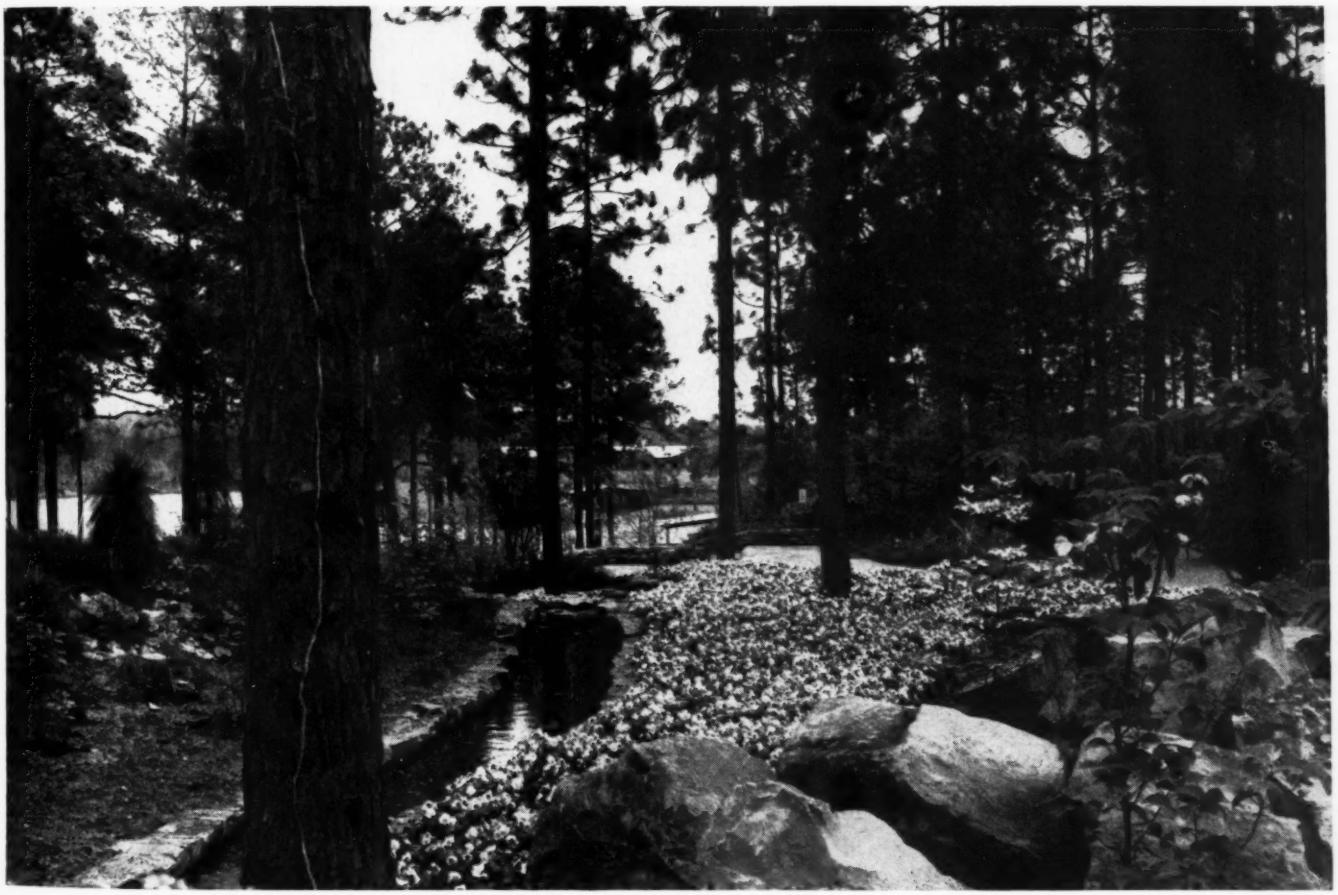
The old quarry with its hummocks was a natural setting for camellia trails, for these aristocratic flowers from China nestle there among rocks on mountains and hillsides. In Hodges Gardens, the camellia finds a precise duplication of its natural habitat.

The recessed rocks are a natural environment for dogwood, too, as well as for many varieties of azaleas.

The spring season at Hodges Gardens reaches its peak

Upper: Numerous pools are full of exotic water-lilies. Here are table-top pads of the Santa Cruz water-lily, *Victoria cruziana*, measuring up to six feet in diameter.

Lower: Thousands of gay pansies nestle among the rocks that border streamlets running through Hodges Gardens.



the early part of April, when azaleas, dogwood, tulips, pansies, and scores of other plants are in full bloom. Popular at this time, too, is the wild azalea, known locally as "bush honeysuckle." This native shrub *(Azalea nudiflora)* covers the hillsides of Sabine and is an attraction that draws residents outdoors in throngs. Almost as plentiful is the wild yellow jasmine or jessamine *(Gelsemium sempervirens)*. In our refuge we make every effort to protect Louisiana's vanishing wild flowers.

The May bloom of modern roses has made this month almost as popular as azalea season at Hodges Gardens. Thousands of Grandiflora, Floribunda and Hybrid Tea roses in a lake-shore showcase overlook a lake-shore stage. Old roses that were threatened with extinction a few years back grow in a special garden on an adjoining hillside. Here, roses that were popular in grandmother's day climb redwood trellises. On this same site, in a special rose test garden, are the "Roses of Tomorrow."

Because Louisiana is semitropical, Hodges' summer garden is growing in popularity. Here tropical water-lilies flourish in reflection pools, alongside the giant floating leaves of *Victoria cruziana.* Among summer shrubs are *Hibiscus rosa-sinensis,* known as princess of the South as well as rose of China, *Leucophyllum texanum* and *Salvia greggii.* There is also a fine collection of lantanas.

Day-lilies add color to Hodges' summer garden. Cannas, in several colors, give dramatic effect to the landscape until frost with their lush foliage. Garden visitors are especially attracted in summer to the candelabra trees *(Cassia alata)* with their glowing yellow racemes of flowers like candles.

Another interesting and rare plant is the striking crimson fountain-grass *(Pennisetum ruppelii)*. As August ends, the cigar-flower *(Cuphea platycentra)* begins to bloom on its tall graceful wands.

Masses of petunias carpet the beds in the main Gardens during the summer. In this season as in all others, Walter Chalupnik, Chief Horticulturist, strives to achieve masses of color with simple flowers, and at the same time to introduce as many interesting and rare plants as will thrive in our climate.

Throughout the summer and fall, roses dominate the scene and continue until camellias open the winter garden. Thus the year-round cycle begins again.

Across the lake from the main Gardens are two greenhouses which accommodate annuals and also bring the tropics close to home. Our Horticulturist makes this site a brilliant show of color all year long.

Lake-shore Stage

A new "department" has been added to Hodges Gardens —a very effective lake-shore stage on which programs of symphonic music, ballet, chorals, and light opera are staged in warm months. Here, too, is presented the traditional Easter Sunrise Service, when choral groups of the El Camino Real area join with the Centenary College Choir in a

(Continued on page 104)

Flower-bordered steps take visitors from one level to another in the main gardens.

SOME PLENTIFUL WILD MUSHROOMS

By G. G. NEARING

Mr. Nearing is a specialist in rhododendrons—he has been growing, breeding, and writing about them since the late 1920's. He is interested in other plants too. He pursued the study of fungi as a hobby, and wrote and illustrated—with seven hundred line drawings—*The Lichen Book*, as well as popular articles on fungi.

FALLEN LOGS and dead standing trunks of trees are often covered with the bracket fungi, white or variously colored shelves projecting horizontally from the dead wood. There are hundreds of different species in many sizes and shapes, almost all with hard or corky texture and so not good for eating. But frequently after a couple of rainy nights, a crop of oyster mushrooms will appear among them. These may come at any season of the year from Easter until Christmas; more frequently, however, during summer. The same log may produce two, three, even four crops in one year and repeat the following season.

In contrast to the hard bracket fungi, these oyster mushrooms, *Pleurotus ostreatus* and *P. sapidus,* are brittle and tender, with moist flesh. Each may be a couple of inches or up to a foot across, white to oyster-gray, stretching sidewise on a short, fat, curved stalk. The stalk is almost always off center, and may be at the very edge of the oval or circular cap. Gills (the radiating blades on the under surface), like those of the common mushroom, run down the stalk, often almost to its base. They are white or very pale gray.

Oyster mushrooms may last one or two days in good condition before the worms invade and destroy them, or they may become wormy after only a few hours. Sometimes one log will yield twenty or thirty pounds at a picking.

No poisonous species is likely to be confused with *P. ostreatus* or *P. sapidus.* The deadliest of toadstools grow on the ground rather than on logs or trees and have a central, usually straight, slender stalk. A couple of somewhat poisonous species vaguely like the oyster mushrooms are tough, stringy, woolly, and astringent, and would hardly be eaten by mistake.

The favorite trees on which oyster mushrooms grow are oak, hickory, tulip-poplar, and maple, but they also occur on other trees.

They should be cut into small pieces, and the base of the stalks and any parts infested with maggots should be discarded. No peeling is necessary—any dirt may be scraped off. After they have been boiled slowly about forty minutes in just a little salted water, with the lid on the kettle, they may be eaten that way or be put for another five minutes in a frying pan with any sauce appropriate to mushrooms. The flavor varies with the season and the conditions of growth, but it is fully as good as that of the commercial mushroom.

In like places and over the same long season, one will sometimes find the sulphur mushroom, *Polyporus sulphureus.* It does not appear twice on the same log. A great mass of the sulphur mushroom will grow from a single point of attachment. There is no stalk, but many horizontal fans reach out from the central area, bright orange on top, sulphur-yellow beneath. The under surface has tiny pores instead of gills, each no bigger than a pin-prick.

A single mass weighing ten pounds is not unusual, and there may be several such masses on one log or stump; most of them will weigh only a pound or two. Sometimes clumps will grow from underground roots, and the under surface may then be pinkish instead of sulphur-colored. This has been considered a different species, but the quality is the same.

The flesh of young sulphur mushrooms is very brittle and dry. In this condition, which lasts only two or three days, it is one of the most delicious mushrooms. As it ages, the flesh becomes leathery and unfit for food. This mushroom requires some patience to prepare. It must be sliced across the grain and boiled slowly for an hour and a quarter. After only an hour of cooking, it remains rather tasteless; if boiled too fast, it is poor in flavor. When simmered for the full hour and a quarter, it develops a flavor and substance scarcely equaled by any other mushroom. A butter or cream sauce at this point will still further delight the palates of those who relish such delicacies.

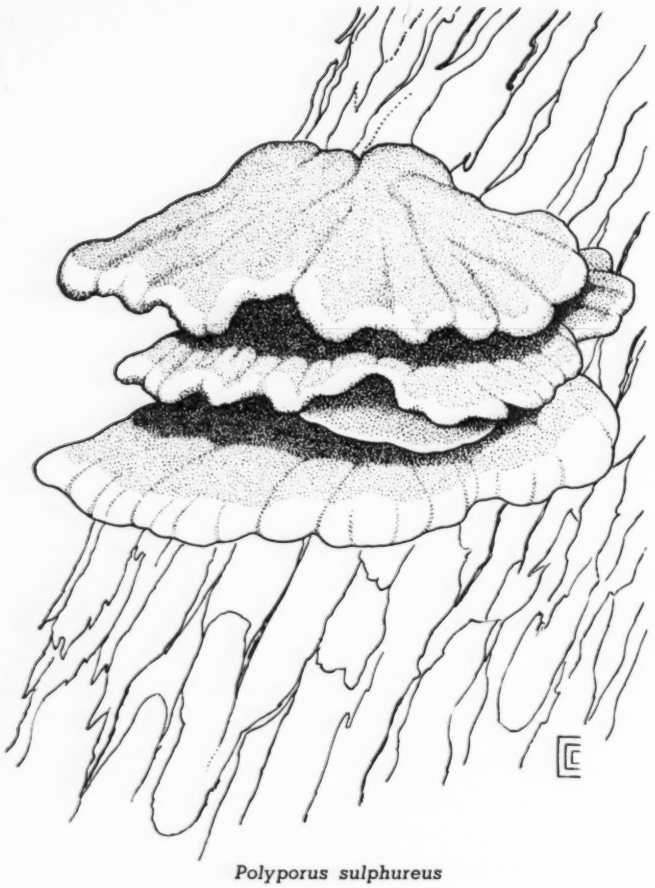
Only two other polypores are as brightly colored. *Polyporus cinnabarinus* is brilliant orange-red above and beneath, but so hard that no one would attempt to eat it. This is also true of *P. croceus,* bright orange, never sulphur-yellow beneath.

In the autumn one may find the bear's head, *Hydnum caput-ursi,* northward or on high hills, growing in a hollow beech, on an oak, or on other wood that is dead but not rotten. It is a shaggy, white mass of drooping spines which almost hide the branching stalks. Clumps weighing several pounds are not unusual.

Variants *H. coralloides,* with longer branches clothed in shorter spines, and *H. erinaceum,* a roundish mass, unbranched, its pendent teeth as much as two inches long, are both equally good eating. But *H. septentrionale,* whose bracket-shaped lobes have the downward-pointing teeth only on the under surface, is tough and has an unpleasant odor and flavor. This is inedible, though probably not poisonous.

The bear's head is a good mushroom, not perhaps one of the most delicious and tending to be a little tough, but it offers palatable food and is unlikely to be mistaken for anything harmful. It requires the usual slow cooking for about fifty minutes.

One of the most astonishing of all mushrooms, the beefsteak, *Fistulina hepatica,* which might even more appropriately be called the beef tongue, appears during late summer and early fall on old, even rotten stumps of chestnut and oak. It grows tongue-like or more widely spreading, with wavy margins, from a wrinkled, sidewise stalk to a length and breadth of several inches, rarely a foot. The upper surface is covered with dark red jelly enclosed in a skin which has the roughness of a tongue, while the red-



Polyporus sulphureus

dish flesh within looks almost exactly like that of beef tongue; a small amount of reddish juice makes the resemblance more startling. The under surface is pink when young, minutely speckled with red. Later the brownish pores open.

During its first three or four days the beefsteak mushroom may be eaten. When cooked it develops a sourish flavor, which some people like, but I prefer to serve it raw in a salad. After I have scraped off and thrown away the jelly, I slice it thin across the grain. It is tender, with a flavor between a mushroom and a tomato.

To mistake the beefsteak mushroom for anything else would be virtually impossible. Superficially it resembles *Polyporus lucidus,* which is much the same in shape and dark red, but hard and rubbery and shining smooth on top. Nothing else approaches it in appearance, and its texture is unique.

Perhaps the most plentiful of all wild mushrooms, one known and eaten the world over, is the honey mushroom, *Armillaria mellea.* It too grows on stumps, logs, and standing dead trees, also from dead tree-roots in the ground. The honey mushroom seldom appears earlier than mid-August and in favorable damp weather through September and October, often into November. Many long, irregularly curving, brown or greenish stalks spring from a central point. Each is surmounted by a typical toadstool-shaped cap, from one to six inches in diameter, brownish or dull yellow above, with the gilled under surface white. Near the top of each stalk is a white, often cottony collar.

Anyone picking the honey mushroom must be alert to distinguish it from the deadliest of all toadstools, the amanita. Both have the typical toadstool shape, with white gills, and in both the spores are white, as can easily be seen where one cap overlaps another, depositing the white dust on the top of the one beneath. There are important differences between the two. The deadly amanita springs from the soil, seldom from rotten wood, individually and not in clumps, and the stalk is upright and very straight. The honey mushroom grows typically in clumps, many stalks rising from a single point in the dead wood, and few of these are either straight or upright; they tend to sprawl in all directions. Both have a ring on the upper part of the stalk, but in the amanita this takes the form of a thin veil, often drooping, while in the honey mushroom it is an outward-spreading collar usually more or less cottony.

Growing in just such clumps is the jack-o-lantern, *Clitocybe illudens,* indigestible or slightly poisonous, but not deadly. It is brownish orange above and beneath, with no collar on the stalk. The honey mushroom, though often dull yellow, is never any shade of orange above and is white or slightly brownish beneath. Other species grow in clumps on wood. Most of them are edible; none is really dangerous.

The name honey mushroom refers to the frequent honey-color of the cap, not to the flavor, which is moderately good but not sweet. The stalks should be discarded, the caps cooked about forty minutes, and then a sauce added to take up a certain sliminess which is not appealing to all tastes. Nevertheless, if one judges by the enormous quantities of this species which are collected and eaten, it must be generally liked.

Mushrooms that grow on the ground should be picked with greater caution than those found on logs and trees. While the wood-inhabiting species could be mistaken at worst for some which are indigestible or mildly poisonous, the species growing on the ground must be distinguished from the deadly amanita.

Perhaps the easiest of all to distinguish is *Hydnum repandum.* This is shaped like a toadstool, buff or brownish on the upper surface of the cap, but when turned over is found to have downward-pointing, whitish spines or teeth like those of the bear's head in place of the radiating gills of the typical mushroom or toadstool. Other hydnums grow on the ground; these are mostly blackish or dark brown, and woody in texture. *H. repandum* has a tender flesh like that of the best of mushrooms and, when cooked about forty to fifty minutes, an agreeable flavor. It is found on the forest floor throughout summer and early autumn, and is fairly common everywhere when the weather suits it.

Mushrooms that have the toadstool shape, but pores on the under surface instead of gills or spines, grow plentifully in the woods all summer and well into autumn. There are more than a hundred species; most of them are edible, but a few are reputed to be poisonous. The safest of these for eating is the pine cone mushroom, *Strobilomyces strobilaceus.* The cap is covered all over with blackish tufts of web-like material; the under surface (of tubes or pores) is grayish white, eventually turning blackish.

Once seen the pine cone can scarcely be confused with any other fungus, though there is a blackish boletus without the tufts which is also edible. Not only safe, it is de-

licious when it has been cooked for forty minutes, the stalk, tubes, and scurfy top surface having been removed. This species is plentiful throughout the summer on woodland banks and slopes.

Typical of this group is *Boletus scaber,* with a smooth cap in various shades of brown, yellowish, and reddish, and pale gray tubes. It is named for the very tiny wart-like growths scattered along its stalk. This and related species may be gathered for food with little risk of poisoning. All require rather long, slow cooking; only the thick flesh of the cap is used, from which the tubes of the under surface have been stripped away.

The mouths of the tubes of the only related poisonous species are conspicuously red, making the under surface red. It is not known just how poisonous they are. But *Boletus felleus,* the largest and fattest of them all, and intensely bitter, is to be avoided. It is distinguished by the pinkish or flesh-colored tubes under a light brown cap, but its bitter taste is the surest warning.

Most species of *Boletus* may be eaten. They are much sought after in Europe, also in this country by people of European origin who are familiar with them under the German name *steinpilz* or the French *cèpe.* After being cooked for thirty minutes or more, they may be served in a variety of ways with equal relish.

Perhaps the safest of all mushrooms is the puffball, a more or less spherical body growing on the ground, sometimes on logs or stumps. Some species are very small, others large—up to a foot or more in diameter. When these mushrooms are young and fresh, their whole interior is a pure white dough-like flesh, and excellent for eating. The outer rind must be peeled off, and the flesh sliced or diced before it is cooked for forty minutes or so.

Sometimes a hillside pasture in early fall will yield several bushels at one picking of *Calvatia gigantea* or *C. cyathiformis;* both are equally good to eat. A log or stump may be covered with *Lycoperdon pyriforme,* enough to fill a large basket, even though each mushroom is only an inch or so in diameter.

As long as the whole interior is pure white, all are edible, with one exception explained in the next paragraph. Age, however, turns the flesh purplish or greenish, and with this change in color bitterness sets in, and the puffball is no longer fit for food. Eventually the whole turns dark green, gray, or purple and becomes a dry dust which puffs up in a cloud if the fungus is stepped on. This dust consists of spores by which the species is perpetuated.

The exception is a little golden-yellow or brownish puffball, *Scleroderma vulgare,* common in the woods on banks or roots of very rotten stumps. Covered with scales, it is tough and poor in texture and quickly turns purple, then black within. I have eaten it when it is white, but some find it indigestible; as it has an inferior flavor, it should not be gathered for eating, but it is not dangerous.

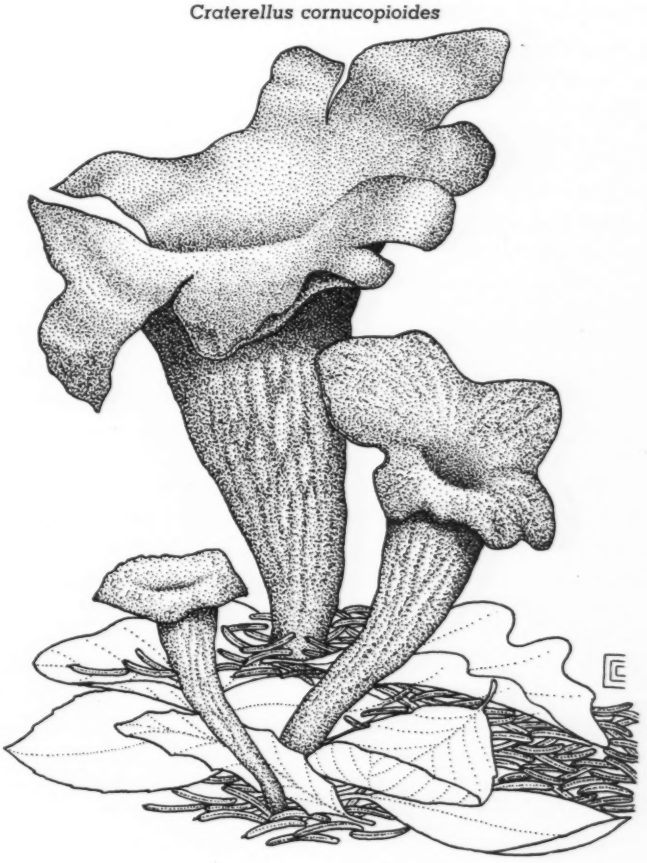
When an exceptionally large *Calvatia gigantea* is found in a field, it may present a problem. If collected, much may go to waste for lack of time to prepare and cook it, for one specimen may weigh twenty pounds or more; if left in the field, it will soon turn color and be spoiled for eating. The best thing to do is to slice off and use the top of *C. gigantea* and leave the rest growing in the ground. This slicing will delay maturity, and a second slice may be removed the next day, and so on for several days. If a number of large puffballs are found together, each may be sliced in this way, and the aging will be delayed until all can be used. But if one has time to prepare and cook a large quantity, it is better to gather them all at once and do so. What is left can be warmed over; the flavor will improve for at least four days.

The manna of the Israelites was probably a puffball rather than any of the many other growths with which it has been identified. The word manna originally meant a gift, or something that could be collected in the wild, something one could get for nothing. Different wild products are still called manna in that region. The wording in the Bible describes accurately a little puffball, *Lycoperdon curtisii,* or one of its close relatives growing in Asia Minor. There are a number of quite similar species widely distributed in the world. No other known growth agrees with the description of manna in the Bible.

Almost as safe as the puffballs are the coral mushrooms, upright simple clubs or variously branched bodies—a host of species, most of which make moderately good food. *Clavaria flava,* uniformly pale ochraceous yellow, with fleshy, almost parallel branches, forms dense clumps three or four inches high. Forty-five minutes of slow boiling will convert *C. flava* into excellent food, if found before it has been infested with maggots.

Clavaria formosa resembles *C. flava* in shape, but its color is pink or salmon with yellow tips; when old the entire plant fades to a yellowish color. *C. formosa* has now been declared poisonous to some people. Older books com-

Craterellus cornucopioides



mend it, and I have eaten it without harm, as have many of my friends. It is not deadly, but should be treated cautiously. Perhaps some specimens, or strains growing in certain localities, contain a small quantity of poison.

Clavaria amethystina of similar branching habit, but usually more open and quite variable, is difficult to mistake because of its pure violet or rich lavender color and translucent flesh. Other coral mushrooms may have a gray or purplish tint, but these are also edible unless too tough and woody. *C. amethystina* is particularly brittle and tender.

A clavaria which does not branch but forms a little club two to four inches high, buff, gray, or brownish, is one of the best. This is *C. pistillaris,* which is found in the woods throughout the summer. It is much thicker near the top than are other unbranched species which occur in many sizes and colors; none is dangerous.

Some species of *Clavaria* and of the somewhat similarly shaped fungi *Thelephora, Stereum,* and *Tremellodendron* are tough and woody and should not be considered for food. They are probably not poisonous except for the doubtful *C. formosa.* All that are tender are edible.

On rather damp flats and banks in woods, particularly where beech trees grow, the black trumpet will be seen by anyone with superior eyesight. It grows from June to September in favorable damp weather and may be looked for in the same spot several times a season, for it recurs there year after year. It is well to take note of such a place, because to find this mushroom at all is an achievement. One searches for it, his eye finally lights on it, but he may look everywhere in the vicinity and see no more than this one. Then as he stoops to pick it, he sees another a few inches away, where he had previously looked and seen none. He moves his foot and finds that he has stepped on one or two, lifts his basket only to discover that it has crushed a couple, then searches the same area again on hands and knees and finds dozens more.

The black trumpet, *Craterellus cornucopioides,* is black or brown and nearly invisible among dead leaves and against banks of moss. It is two or three inches high, shaped like a tin horn, and becomes wavy and wrinkled as it ages. After picking it, one could blow through it.

For about a week it remains edible, but then maggots invade it, or it dries or rots away. *C. cornucopioides* is my favorite of all mushrooms. When it is boiled slowly for about forty minutes, it is delicious. There is no harmful fungus with which it could be confused. *Urnula craterium* is urn-shaped rather than trumpet-shaped, and while it, too, is black, it does not appear to be injurious.

Weather that brings out the black trumpet also favors the chanterelles. One of these, *Craterellus cantharellus,* is related to the trumpet and of somewhat the same general shape, but usually larger and fatter. Instead of being black it is egg-yellow, and instead of having a hollow center, it is well filled with a crisp white flesh. *Cantharellus cibarius* and *Craterellus cantharellus* look so much alike that at first glance one would suppose them to be the same, little wavy-edged yellow trumpets scattered about the damp woodland floor. However, the outer or under surface of the stuffed trumpet is merely wrinkled in *C. cantharellus,* and in *C. cibarius* it is covered with gills, not the paper-thin gills of most toadstools, but thicker, blunter ridges, rather widely spaced and conspicuously forking once or twice as they run upward.

Both forms are excellent food, celebrated in France as chanterelle, in Germany as pfefferling. The German name suggests the taste of the raw flesh, slightly peppery, but when cooked the usual thirty to forty minutes, it is wholly delicious. Another growing in similar woodland sites, but especially on banks of moss, is the cinnabar chanterelle, *Cantharellus cinnabarinus.* This is smaller and a brilliant reddish orange, fading to pink, but otherwise it is very much like *C. cibarius.*

All these trumpet-shaped mushrooms retain their color when cooked, except the black trumpet, which cooks up blacker. When stewed together, the striking black, red, and yellow elements mix in an unusual dish to set off the superb flavor.

Cantharellus aurantiacus is the same shape and size, and of a brownish orange color. It differs, however, in one important respect: the gills are paper-thin and closely crowded, contrasting with the thickish, widely spaced gills of the other species. Their only similarity is the characteristic forking. Recent writers have declared it edible, not poisonous as it had been thought to be.

It must be remembered that when a deadly amanita is placed in the same basket with edible mushrooms, and left there an hour or two, all the mushrooms in that basket become poisonous, no doubt because of the amanita spores shed upon them. Some poisonings recorded from a particular fungus eaten by the victim may have been caused by

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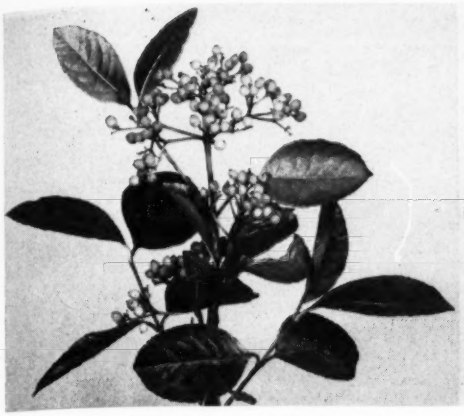
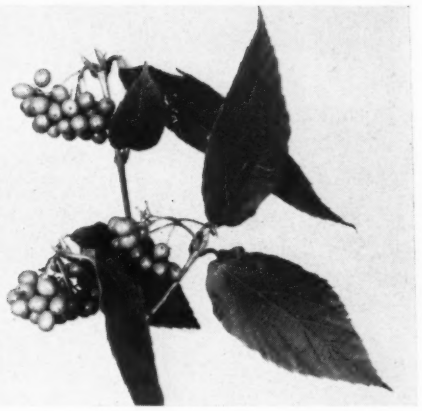
When collecting edible fungi, one must be ever on the alert for the deadly amanita.



The glossy green leaves and the fruit clusters of *Viburnum cassinoides.*

The sparse black fruit and the well-developed buds for the next season on *Viburnum acerifolium.*



The drooping red fruit clusters of *Viburnum setigerum.*

VIBURNUMS THROUGH THE YEAR

By DONALD R. EGOLF

Dr. Egolf is Cytogeneticist at the United States National Arboretum, Washington, D. C.

(Continued from the March-April issue)

During mid-May the majority of the viburnums produce their abundant cymes of fertile creamy white florets. The mass display of such species as *V. acerifolium* (4), *V. cassinoides* (4), *V. dilatatum* (5b), *V. hupehense* (6), *V. lantana* (4), *V. lentago* (3), *V. lobophyllum* (6b), *V. prunifolium* (4), *V. setigerum* (6), and *V. wrighti* (5b) is noteworthy for only a few days. Although the display may be brief, it nevertheless contributes to the usefulness of these species that are more effective at another season.

The "snowballs," composed of globose clusters of enlarged sterile florets, are among the showiest of the viburnums. However, since the florets are sterile, their ornamental value is entirely dependent upon the flower display. *V. opulus roseum* (3b), the European snowball, was commonly planted by the early settlers and is frequently associated with lilacs in Colonial gardens. *V. macrocephalum* (7), the Chinese snowball, is the least hardy and cannot be grown successfully north of Baltimore unless in a well-protected location. The inflorescence of the Chinese snowball may be as much as eight inches in diameter, in sharp contrast with the four-inch leaves. The Japanese snowball, *V. plicatum* (5b), is one of the most adaptable but will not withstand severe winters. This plant is more generally known as *V. tomentosum sterile,* but *V. tomentosum* is not a valid name, and the plant with the fertile florets encircled by sterile florets should properly be identified as *V. plicatum tomentosum* (5). Since aphids are not a serious problem of *V. plicatum*, the home gardener who desires a snowball would do well to plant this species rather than *V. opulus roseum.*

Viburnum plicatum tomentosum, the double-file viburnum, is one of the species that contribute to the late spring display. It rates near the top of any select viburnum list, with its architecturally tiered branches lined with twin rows of cymes. A mature plant may attain a height of nine feet and possibly an even greater breadth of horizontal branches. *V. plicatum tomentosum* is hardier than *V. plicatum.* In the autumn the foliage of *V. plicatum tomentosum* produces some good purplish red hues. The cultivars 'Lanarth' and 'Mariesi' differ little from each other but are more showy than the original species. The cultivar 'Rowallane' (5) is a fine-textured specimen that has smaller leaves, flowers freely, and fruits abundantly. *V. plicatum tomentosum* 'Roseum' (5) is a plant that varies from year to year in performance, depending on the climatic conditions. If the season is cool and the soil slightly acid, a pale pink color will develop in the sterile florets. The horizontal lines of the double-file viburnum are effectively displayed when planted on a slope so that they are viewed from above. *V. opulus* (3b), *V. trilobum* (2), and *V. sargentii* (5) have the same type of inflorescence in late May, but are more conspicuous in the autumn with red fruit. The masses of creamy white panicles of *V. sieboldii* (5) are also well displayed in late spring on a large shrub or tree which may grow to a height of thirty feet.

The anticlimax of the flowering season in early summer is achieved with *V. dentatum* (3) and *V. rafinesquianum* (3), two natives of the Northeast. Neither is as spectacular as some of the earlier-flowering species, but the airy white masses of bloom are worthy of consideration since they are produced when few other shrubs are in flower. The multiple-stemmed *V. dentatum* tolerates shade and moist or dry conditions and is adaptable to naturalistic planting. *V. rafinesquianum* is a refined four-foot-high plant which can withstand extremely dry conditions of road embankments and slate slopes.

The summer foliage of viburnums encompasses many diverse types and textures such as the soft, pubescent leaves of *V. buddleifolium,* the deeply rugose leaves of *V. sieboldii,* the smooth, glossy leaves of *V. prunifolium* and *V. cassinoides,* the stellate-pubescent leaves of *V. plicatum,* and

Above. The multiple-colored fruit clusters of *Viburnum lantana* in late summer.

Right. The red fruit clusters of *Viburnum opulus.*

the evergreen, wrinkled leaves of *V. rhytidophyllum.* The various species complement and contrast with each other to create a pleasing summer-border composition. A number of foliage variants with variegated, yellow, bronzed, or mottled leaves can be displayed to some advantage, but most of these are monstrosities with little ornamental merit.

The fruit display in midsummer gives a pre-season glimpse of what the autumnal exhibition will provide. *V. fragrans* is one of the first to mature fruit that changes from red to black. The brilliant red fruit of *V. plicatum tomentosum* is evident for only a few weeks in early August; then it ripens to black and is devoured by the birds. Likewise, the maturing red fruit on the red pedicels of *V. sieboldii* are readily eaten by the birds; however, the red pedicels remain to provide a contrast against the dark green, rugose leaves.

V. lantana (4) probably affords the best display for the shortest period of time in mid-August, when the fruit clusters contain the brilliant orange-red fruit in various stages of maturity. The dense, rounded *V. lantana* will usually be observed as a six-to-eight-foot specimen, but it can attain a mature height of fifteen feet under favorable conditions. Although the plant is not outstandingly ornamental, it combines good traits with hardiness and adaptability to dry environments so as to provide a useful shrub for northern gardens. *V. lantana rugosum* (4) has larger, darker green, and more wrinkled leaves. *V. veitchii* (6) and *V. cotinifolium* (5b) are similar to *V. lantana,* but are not often cultivated.

Few groups of ornamentals can equal the luminosity of the yellow, red, blue, or black fruit display of viburnums. The fruit extravaganza begins in late summer and continues through the autumn into late winter. Often the fruit display is complemented by the autumn coloration of the foliage; but, in general, it reaches its peak when the leaves have fallen and the fruits are exposed.

The blue- or black-fruited species are usually the least showy, but the change from green to black often includes multiple color of green, pink, and red to black in the same cluster. *V. prunifolium,* black-haw, is one of the most adaptable plants of the genus. The horizontal black branches with abundant spur growth compose a large upright shrub or small tree of fifteen feet. The heavy-textured, glossy foliage assumes a purple-red in autumn at the same time that the fruit is in various stages of maturity before becoming blue-black and covered with a heavy bloom. The southern black-haw, *V. rufidulum* (6), with blue-black fruit, is less hardy. The handsome, glossy foliage assumes a dark blood-red in autumn. The blue fruit is retained until winter on the taller-growing *V. lentago* which develops into a round-topped specimen thirty feet high. The abundant blue-black fruit on the bushy *V. dentatum* is an excellent source of food for birds. The red and scarlet autumn colors of this plant will accent any naturalistic planting. After the fruit has turned blue-black, the glossy green foliage of the symmetrical *V. cassinoides* assumes a clear red. The related *V. nudum* (6) is a larger plant with large lustrous leaves which become dark red in autumn, but it is less hardy. The black fruit of the maple-leaved viburnum, *V. acerifolium,* is insignificant, but the purplish red foliage will enhance any dry acid woodland trail.

Since there are few yellow-fruited ornamentals, the four viburnums that bear yellow fruits are worthy of cultivation. As the fruit matures, it passes from pale yellow to dark orange and brown on *V. opulus xanthocarpum* (3b), *V. sargentii flavum* (5), and *V. setigerum aurantiacum* (6). The first two are also decked with good yellow foliage. The firm, pale yellow fruits of *V. dilatatum xanthocarpum* (5b) persist much longer on the plant and afford a fine contrast when used in a mass planting with *V. dilatatum.*

The persistent red-fruited viburnums are the most highly prized; all are practically of Asiatic origin. The brilliant scarlet fruit of the compact *V. dilatatum,* the linden viburnum, rates first among the red-fruited species. The abundant four-to-six-inch clusters furnish a display from mid-September until late winter. An eight-foot specimen covered with fruit can become a focal point in any garden. The densely pubescent leaves are russet-red in autumn. Select

clones of this plant are now in cultivation, but many plants offered for sale are seedlings which, in all probability, will develop into a heterogenous lot of fruiting forms. These may include inferior plants unworthy of select garden soil. The allied red-fruited *V. wrighti* (5b) is nearly unkown in cultivation in this country. The ovate, glabrous leaves and the glabrous red bud scales distinguish this plant from *V. dilatatum,* which has pubescent leaves and gray-brown bud scales. The plant frequently sold as *V. wrightii* is a more densely pubescent form of *V. dilatatum. V. wrightii* grows to nine feet, while the dwarf *V. wrighti hessei* (5b) is only three feet tall.

V. betulifolium (6) is not a reliable plant in the North and will seldom fruit abundantly. Young plants are sparse-fruiting, but twelve-foot-high, wide-arching plants mature in milder climates and carry a mass of fruit. *V. betulifolium* is often confused with *V. lobophyllum,* which has leaves broadly ovate, abruptly narrowed at the apex, rounded at the base, and with shallow teeth on the margin. Those of *V. betulifolium* are ovate to diamond-shaped and broadly wedge-shaped at the base, and the terminal part is more gradually tapered and coarsely toothed. *V. lobophyllum* (6b) is an upright plant which grows fifteen feet tall; it has red fruits which persist until cold weather, when birds find them a source of food. *V. hupehense* (6) has similar translucent red fruits but is shy in fruiting every year. The slender branches of *V. ichangense* (7), laden with small scarlet fruits, are spectacular in the autumn; but the overall leggy habit of growth of this six-foot species does not make it desirable for the home grounds. The tea viburnum, *V. setigerum (V. theiferum)* (6), is an erect shrub whose branches often arch under the weight of the fruit clusters. Upon exposure to freezing, the fruits become translucent. In northern areas the plant is subject to injury from late spring frosts and is rarely more than six feet tall; but in milder region it will grow to twelve feet tall.

The native *V. trilobum* (2), the American cranberry-bush, is much less extensively cultivated than is *V. opulus* (3b), the European cranberry-bush. In northern areas, the American cranberry-bush cannot be surpassed. Since it grows far north into Canada, it will withstand the severest winter. *V. opulus* is annually disfigured by aphids, whereas *V. trilobum* is immune to this distortion. These species are much confused, and consequently the true *V. trilobum* is cultivated far too little. *V. trilobum* can be distinguished from *V. opulus* by three distinct broad lobes of the leaf, small glands on the base of the petiole, a narrowly-grooved petiole, smooth and light gray-brown branches, and an overall wide-spreading habit of growth. The fruit of *V. opulus* is bitter; that of *V. trilobum* is edible, and it makes fine jelly. The *V. trilobum* cultivars, 'Hans', 'Andrews', and 'Wentworth', were selected for their fruits. 'Andrews' has stout stems which hold the large, late-ripening fruit erect. 'Hans' has medium-sized fruit clusters which ripen in September; and 'Wentworth' is a vigorous, spreading bush which has broad, drooping clusters of large fruits which ripen in mid-August. The lower-growing 'Compactum' produces many thin stems and fruits well. A pink-flowering form has been recently found in British Columbia. The more vigorous *V. opulus* 'Notcutt' may well provide a good replacement for *V. opulus.* The intermediate, five-foot *V. opulus compactum* is free-fruiting and is more adaptable to use in modern landscapes than the tall, coarse-growing *V. opulus.* The third species with deeply lobed leaves, *V. sargentii* (5), can be distinguished by the elongated central lobe of many of the leaves, especially on young vigorous growth; the dark corky bark of the older branches; and the purple anthers. Sargent's viburnum is a plant of imposing upright stature, with heavy-textured leaves. The fruit is usually less abundant than that of *V. opulus* and *V. trilobum.* The autumn landscape is accentuated by the orange-red autumn foliage as well as by the vivid red fruit of *V. opulus, V. sargentii,* and *V. trilobum.*

The large brilliant scarlet fruit clusters of *Viburnum dilatatum.*

RHODODENDRON DISCOVERIES IN MALAYSIA

By DAVID G. LEACH

Mr. Leach is a geneticist who is hybridizing rhododendrons on a fairly large scale at his home in Brookville, Pennsylvania. His book, *Rhododendrons of the World,* is expected to be published soon by Charles Scribner's Sons.

IN THE ERA OF Victorian conservatories and hothouses the so-called Javanese rhododendrons had a great vogue. During the "Mauve Decade" the great arched glasshouses of the wealthy produced innumerable hybrids, exotic in the unfamiliar orange and yellow combinations of the impressively proportioned flowers. These were borne intermittently throughout the year on plants that grew more or less continuously. The floral fashion of that leisurely period vanished with its untaxed riches. Today there are only a few collections of these unusual hybrids in Europe or America; one of them is at Longwood Gardens, Kennett Square, Pennsylvania. The species from which they came have remained, by and large, a group of mystery, intriguing and baffling those who have sought a systematic under-

standing of their distribution and botanical relationships.

The group includes many scaly-leaved rhododendrons of extraordinary interest. The "lost" species, *Rhododendron toverenae,* with the largest flowers in the entire genus, belongs here. It was discovered by Hunstein in 1884 in the Horseshoe Mountains of New Guinea. The immense, fragrant, white flowers were seven inches in diameter and about five inches in length. In 1959 the Rev. Mr. Cruttwell of the Anglican Mission collected it on Mt. Dayman, and it is once again in cultivation. *R. superbum* has great five-inch, carnation-scented, pink flowers. *R. maius* and *R. archboldianum* are also outstanding ornamentals among those with large, fragrant, white or pale pink blossoms. *R. aurigeranum, R. zoelleri,* and *R. brassii* are conspicuous in the group with yellow to orange flowers. *R. konori* is highly regarded by Dr. H. Sleumer at the Rijksherbarium in Leiden, and it has been successfully grafted on *R. ponticum* understock so that it, too, is now in cultivation.

This whole class of rhododendron springs suddenly back into the limelight as a result of several expeditions to New Guinea in the last couple of years and the subsequent publication of Dr. Sleumer's invaluable classification of the more than two hundred and fifty species.

It seems unlikely that the influx of new species from recent explorations in New Guinea will contribute to gardens in the northeastern United States, although some may prove to be acquisitions for the mildest parts of the Pacific coastal region. A few originate at altitudes as low as four hundred feet, but the majority of the New Guinea rhododendrons come from the middle elevations and subalpine forest below thirteen thousand five hundred feet of the high mountains. Perhaps a small group that is found on open grasslands a thousand feet or more below the snowfields, such as *R. stonori* or *R. saxifragoides* which are truly alpine, may be amenable.

The required adaptation is formidable. I scouted some of these rhododendrons in nature in the Indonesian islands and in Malaya, Cambodia, and Viet Nam in the spring of 1960. At that latitude there is little variation in temperature winter and summer, and almost equal length of day the year around. Similarly constant conditions in the warm greenhouse in the United States produce continuous growth and flowering in all seasons on rhododendrons from the lower elevations.

In New Guinea at the higher elevations, the frost line is between seven thousand and eight thousand feet on some mountains, according to Dr. L. J. Brass of the Archbold Expedition, and frosts occur there every clear morning throughout the year and more generally above ten thousand feet everywhere on the island.

The recent publication in Indonesia of Dr. Sleumer's monumental study of the rhododendrons of Malaysia probably foreshadows a complete reshuffling of the classification of the whole genus. It seems likely that we shall once again be thinking in terms of the subgenera, sections, and subsections familiar to botanists from the system in use before 1930. There will be some familiar names in the sections and subsections, but species collectors had better brace themselves for such strangers as *choniastrum, pseudovireya,* and many others which sound equally alien.

In 1958 Dr. Sleumer published *The Genus Rhododendron in Indochina and Siam,** in which he first mentioned the discovery in Sumatra of a non-scaly rhododendron in the Irroratum Series, a group of related species prominent in gardens in mild climates. This new species, subsequently described as *R. atjehense,* takes its place with Miquel's *R. korthalsii* as the most southerly of the elepidote (scaleless) rhododendrons and the only known species of this group that occurs on the islands off the southeastern coast of Asia.

The superb flower of a hybrid Javanese rhododendron.

In the same publication Dr. Sleumer demonstrated that rhododendrons without scales on their leaves and formerly regarded as exclusively southeastern Asian in their distribution extend into the Malay Peninsula. Species allied to *R. javanicum,* the scaly group that produced the Victorian hybrids, occur all the way from the islands of Indonesia to Viet Nam. Perhaps most surprising of all, a constellation of shrubby species of *Rhododendron* named for their resemblance to huckleberries, of which *R. vacciniodes* is typical, covers a vast region from the eastern Himalaya and southwestern China southward into Malaya and even into New Guinea, Formosa, and the Philippines, a tremendous sweep of four thousand miles.

All this entirely changes our ideas of the distribution of rhododendrons. In *The Species of Rhododendron,* published in England in 1930, which has formed the general conception of the genus, the rhododendrons of Viet Nam, Laos, and Cambodia were simply omitted and those of Thailand were passed over lightly. The editor observed, "It has been judged expedient to reserve the Malayan and New Guinea species for future consideration."

Now it is apparent that the Maddenii Series extends into North Viet Nam, Laos, and Thailand. Many in this series of greenhouse rhododendrons have imposing white, scented flowers on aerial shrubs growing like orchids on the limbs of trees. We know now that the beautiful scarlet-

(Continued on page 104)

*In *Reinwardtia,* published by Herbarium Bogoriense, Kebun Raya, Indonesia.

FLOWERS AND THEIR FRUITS

By HAROLD WILLIAM RICKETT

Dr. Rickett is Bibliographer and Senior Curator of the Library of The New York Botanical Garden.

(Continued from the March-April issue.)

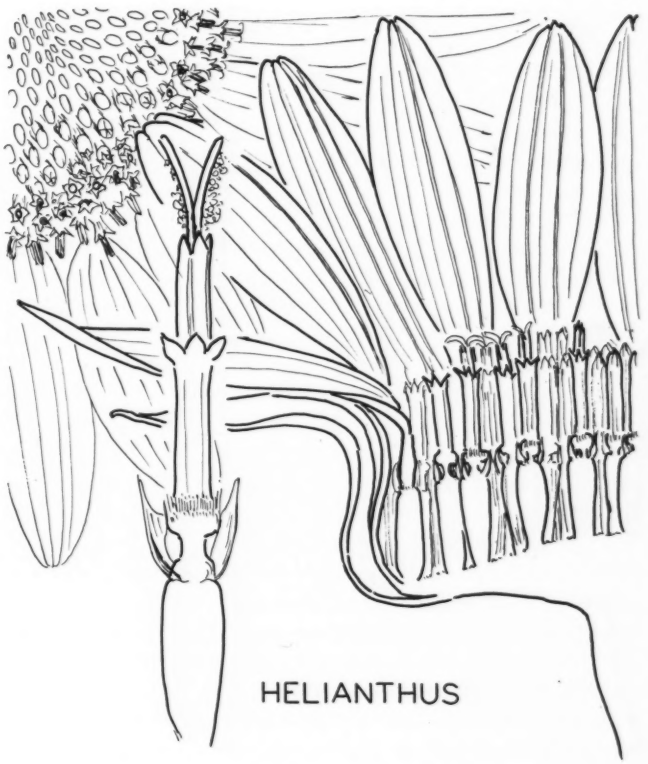
FRUITS are various not only in size, color, succulence, and taste, but also in their structure and origin. If we adopt the botanical definition—the matured ovary or ovaries with any parts that adhere—we add to the fruits of our tables a vast assortment of inedible and curious objects—the miscellaneous produce of flowers. The fruit of a botanist (at least during the professional part of his day) is evidently not that of our markets, where apples and bananas are fruits, but tomatoes and cucumbers are "vegetables." The latter share this category with potatoes and cabbages, which have nothing to do with flowers. What is the difference between fruits and vegetables?

To answer this question takes us rather far afield. "Vegetable" meant, only a scant fifty years ago, simply "plant." All plants were vegetables, and all parts of plants were vegetable—as distinct from animal and mineral. On the table "vegetables" came to be contrasted with the meats and other animal products, and so the word became limited to edible plants and parts of plants. Moreover, it somehow acquired its current connotation of plant products served *with* the meat. In fact this is the basis of a legal definition: vegetables are plants and parts of plants served with the meats, while fruits are those brought on with the dessert. So string beans, peppers, and zucchini are vegetables while grapes, peaches, and blueberries are fruits. Perhaps the distinction means something to the legal mind, which may even relish placing cranberries with vegetables and enjoy the resulting ambiguity of bananas. Actually all these things have the same origin—they are all essentially matured ovaries—and for the present discussion any separation of "fruits" and "vegetables" would be worse than meaningless.

As we survey the vast panorama of the flowering world, as we attempt to classify flowering plants, to bring together those with similar organization on the theory that they had a common ancestor in the remote past, we notice certain distinct trends in the evolution of flowers. There is evidence that the earliest flowering plants had large flowers with numerous stamens and pistils. In some other, presumably more recently developed families the flowers are small, with only a few stamens and pistils. The parsley family—carrots, celery, dill—has many tiny flowers massed together in an "umbel," all serving as one large flower (and so considered by Linnaeus). In some of these the outer flowers differ from the inner; the outer larger ones may serve to attract the insects that pollinate them all. The same division of labor is seen in certain hydrangeas and viburnums (as the double-file), in which the outer flowers are sterile, the inconspicuous inner ones providing the fruit. The end of this tendency is the daisy family—the sunflowers, chrysanthemums, dahlias, zinnias, asters, the goldenrods, dandelions, and the ragweeds. The flowers of this family are tiny, complex, closely compacted in "heads" which we mistake, perhaps, for single flowers.

If we cut a sunflower in half, vertically, we can easily see the numerous individual flowers standing erect on a nearly flat disc. Each flower has two "joints"; the lower half is white, angular; the upper yellow, tubular, dilated at the lower end, with five teeth at the upper end. This yellow part is composed of five united petals. The part below corresponds to the stalk of other flowers. It bears at its summit—at the base of the petal-tube—a pair of small pointed scales; these correspond to sepals. As the flower opens, the dark heads of the five stamens—all joined at their edges to form a cylinder—appear from the five-toothed tube. Later the style pushes up through this cylinder, its two branches spreading apart as they emerge and displaying their inner, receptive surfaces. The pollen formed by the stamens will have been pushed out of the stamen-tube by the tip of the style before its branches separate. At the same time the stalks of the stamens coil up in the dilated lower end of the tube of petals, pulling the anthers down into the tube again. In spite of its size, this little flower is far from simple; it has all the parts that a larger flower has and a complex mechanism that, as can be easily seen, prevents it from pollinating itself.

The flowers on the margin of the disc differ in two particulars: their joined petals are extended on one side to form the "ray"; and they have no stamens or pistils. Many composites, such as thistles, have no ray flowers. On the other hand, some, as Indian cup *(Silphium),* have fertile



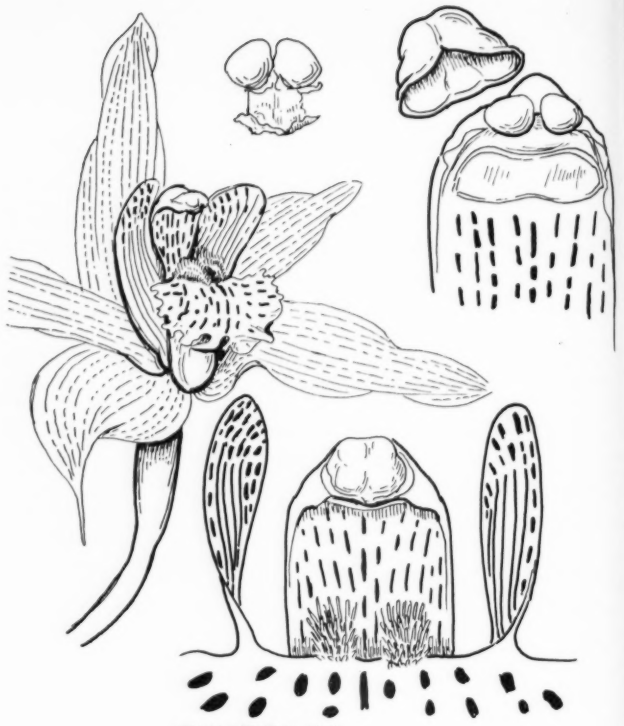
ray flowers that form fruit, while the flowers in the center, the "disc flowers," are sterile. In still others, as dandelions and chicory, all the flowers are like ray flowers and, of course, fertile.

Each ovary in a sunflower is within the part I have compared with the stalk, that white lower part of the individual disc flower. When the seed develops from the single ovule, the ovary remains enclosed by and inseparable from this stalk, and the entire body thus formed becomes the fruit—what we usually call the seed. This is true of all plants in the daisy family. The sunflower "seed" that we feed the chickadees in winter is really a one-seeded fruit. The dandelion "seed" is the same. The parachute of fine hairs that enables it to drift in the air corresponds to the two small scales, the sepals, of the sunflower. Thistledown, which carries a troublesome weed to the farmer's grain-fields, is similar.

All this may seem unnecessarily complex; but one other family must be mentioned to give this story even a slight claim to being complete. The evolution of flowers has certainly proceeded in several quite distinct directions. The end of one trend is the close inflorescence or "head" of small, complex flowers just described. That humble pest, the dandelion, stands near the top of its particular evolutionary tree. Another line led to the almost microscopic, inconspicuous flowers of oak and willows, which also have the essential parts, and little else. But still another group of evolving plants was not content to produce smaller and smaller flowers, but verged towards display, towards gorgeous color and striking form, and finally produced the orchids.

Orchids are so numerous, so complex and various that it is almost impossible to summarize them briefly. As a family they may seem to favor the conspicuous, even the garish colors; but this impression is due chiefly to those that are generally in use for personal adornment. Actually the flowers of some orchids are small and inconspicuous, and no color is lacking from the orchid spectrum; there are green flowers, red, blue, and yellow flowers, white flowers—and all possible combinations.

In structure the orchid flower is organized on a different pattern from lilies, roses, magnolias, and strawberries. These flowers are "radially symmetric"; that is, similar petals, similar sepals extend in all directions from the center. The orchids (and many other flowers) are "bilaterally symmetric"; the petals and sepals on the right mirror those on the left, but those above are unlike those below. They vary as strikingly in form as in color: they simulate in general appearance small insects or doves or dancing girls or slippers. One petal of an orchid, usually the lower, differs from the other parts; it is generally larger, differently colored, of a different shape; it is commonly the most conspicuous part of the flower, as in a cattleya; this is the "lip." Above or behind it is something not seen in any other family, the "column." It may be small and modestly colored, or flamboyant and simulating another petal. It is formed of style, stigma, and stamen (in some orchids two stamens)—all joined. It is on this complex body that botanical interest is focused, for it has its own astonishing ways of accomplishing fertilization. It takes many forms and colors; but the essential parts—pistil, stamen, pollen



CYMBIDIUM

are the same parts as are found in a dandelion or a rose, and accomplish the same results.

In the flower of a cymbidium the column rises at the base of the lip, brooding over it like some small, brightly colored bird with its head pulled back between its wings. At the tip is a white shield; poke a pencil at this and it flies off, disclosing two orange masses of pollen; this then is the stamen, or the head of it. When the intruding point is pulled back, the pollen-masses *come with it.* They are stuck to it by a small transparent flap, on which they stand erect; the foot of this was covered with liquid cement which set immediately when it was exposed to the air. In nature, of course, the pollen-masses are removed by the intruding proboscis of an insect, which thereafter wears them like plumes as it passes from flower to flower.

Within a few seconds of the removal of the pollen, the little flap that bears the pollen-masses contracts unevenly so that they are now brought to a lower position and point forward. When the insect lands on the lip of another flower of the same kind, the pollen-masses will strike the column *just below the stamen-head.* In exactly this position on the column is a broad, lucent disc; this is the stigma. A few (or a few hundred) pollen grains will adhere to this disc, and pollination is accomplished. Many more remain attached to the insect pollinator and will contribute to the fertilization of another flower of the same kind, and another, and another . . .

This is but one of the surprising tales the botanist can tell of the pollination of flowers. One thing that strikes the mind is that flowers seem to go to a lot of trouble to avoid pollinating themselves. But this is not (as Darwin thought) a universal law. There is nothing inherently bad in self-fertilization or "inbreeding." Some flowers, in fact, regularly pollinate themselves generation after generation.

Cross-pollination, however, provides for the mixing of different inheritances and adds to the chances the species has for survival in a changing world.

It is difficult to survey such mechanisms, such apparently purposeful arrangements, without thinking of plants as consciously planning their own future. This seems absurd; the botanist usually offers chance variation and natural selection as an alternative, which places something of a strain on the imagination. What the answer is I cannot say.

EDIBLE FUNGI (from page 96)

the indirect amanita poisoning. Harmless mushrooms may thus have been condemned unjustly; yet it is wisest and safest not to eat any species ever recorded as poisonous.

Among the earliest mushrooms to appear in spring are the inky caps, species of *Coprinus. C. micaceus* will cover the whole side of a maple stump or an exposed elm root with little caps so closely crowded that most of them touch each other, and many may be compressed out of normal shape. They are pale buff and helmet-shaped, very perishable and soon turning blackish, for the spores are black. They must be picked before they turn color. They rank with the most delicious of fungi, requiring to be cooked hardly more than ten minutes and are tempting no matter how they are prepared.

The black spores contrast with the white of the deadly amanita, and although some black-spored species have bad reputations, none is deadly. The spores are so black that an ingenious person tried making ink out of them and reported the experiment a success.

Two much larger species of *Coprinus* are often found on lawns and in pastures; *C. comatus,* the shaggy mane mushroom, more or less covered with an irregular coat of long, drooping hairs, and *C. atramentarius,* rather similar but hairless and very smooth except for the striations characteristic of the genus. These mushrooms tend to clump together, but may grow scattered, and always have a helmet-shaped cap, gray to blackening, on a thin whitish stalk. If gathered while they are fresh, they cook to deliciousness in a few minutes; if not picked in time, they soon melt down into a black liquid.

During the month of May, when most mushrooms have not yet made their appearance, the morel is at its height. *Morchella esculenta,* three or four inches high, is shaped somewhat like the ace of spades. The entire head is covered with a pattern of pits and ridges—this pattern should be noted carefully. The ridges may be irregularly arranged or, as in closely related, also edible species, lined up in straight rows, but the spaces between them are deeply cup-shaped. The whole upper part, with this cupped structure, is gray narrowed abruptly into a whitish stalk which is merely wrinkled. The whole structure is one continuous inverted hollow sack.

Verpa bohemica looks very similar, but the upper parts are not continuous with the stalk. Instead, the pits and ridges are on a hood which fits down over the stalk, but barely touches it. *V. bohemica,* too, is edible; however, some people have experienced an odd nervous upset after eating it. This lasts only a short time.

Another mushroom of the same general structure is *Gyromitra esculenta.* The cap and stalk are continuous as in the morel, but the cups are inverted into blisters, with grooves between them instead of ridges. This pattern, opposite to that of the morel, makes identification easy. Some eat *G. esculenta,* while others have been seriously poisoned by it, especially when it is old; it should be avoided. The color is bright brown.

Pastures, orchards, and sloping banks should be searched for the morel, which may easily escape notice. In favorable damp weather, many can often be found. The morel is slightly tough, but very tasty. If stuffed as peppers are stuffed and baked, it makes a most unusual meal. Only the lower part of the stalk need be discarded.

There are hundreds of other species of mushrooms growing everywhere in woods and fields. Most of them can be eaten, many are too tough or disagreeable, and some are more or less poisonous. Those described in this article are among the safest, the best-flavored, and the most plentiful fungi in our region. But for safety's sake, it will be well for anyone who eats wild mushrooms to obtain at least one illustrated book on the subject (several are available) and to become acquainted with other species, edible and poisonous, in order to diminish still further the possibility of a disastrous mistake.

In case of any doubt whatever, a reputable mycologist should be consulted.

COUNTRY HOUSEWIFE'S GARDEN (from page 89)

after two or three years, the basal rosettes rot over the winter. However, seedling plants are usually found about the old ones, no matter how carefully the heads have been cut off. It may be that the soil in the herb garden is not quite sandy enough for the plants. One year I broadcast the seeds upon a gravel bank at the edge of the driveway, and it was soon covered with young plants of *Sanguisorba minor.* They are very pretty in a mass or as an edging for the vegetable garden bed because, as one looks down upon them, he will observe that the unfolding leaves sparkle with drops of dew which linger on them longer than on the grass and other herbage. After three years the bank was quite devoid of burnet clumps, possibly because I had sown tansy seed at the same time and the taller growth of *Tanacetum vulgare* overshadowed the lowly burnet.

On the West Coast salad burnet has been tested as a forage crop for sheep. The deep roots permit the herb to grow under conditions of drought on sandy soil that will not support grasses. In New Jersey it has been planted along the coastal plain by the Wildlife Management Section of the New Jersey Division of Fish and Game, because it provides forage for animals and the seeds are attractive to many species of birds, particularly quail. The work there with burnet for several years has shown that fertilization increases the seed yield and the protein-content of the seed up to sixty per cent. No mention is made of the loss of plants by feeding. An old idea of herbalists that burnet would die out on rich soil seems to have no basis in fact, if other factors such as sunlight and limestone are sufficient. The fat-content of burnet seed is nearly as high as that of soybean seed, and this may explain in part its use by birds as a high-energy food.

Another very attractive but presently less used member of the rose family in the herb garden is the ladys-mantle.

This very hardy Arctic plant *(Alchemilla vulgaris)* will stand extremes of cold and drought and does not require a rich soil. The foliage is its most interesting and beautiful characteristic. The dense short hairs which cover the palmately-lobed leaves give a velvety texture; the leaves are almost white on the under side. As they unfold slowly from tight pleats, the three-to-four-inch broad leaves hold the morning dew; at any time of day in the hottest summer weather, shining beads of moisture glisten in the folds of ladys-mantle. Perhaps the common name was derived from the stylish tailoring of the leaves or from the protective coating that makes them nature's example of waterproof material.

When the little airy yellow blossoms on angular stems appear in June, the plant looks like a modern flower arrangement held firmly in place by the artistic rosette of basal leaves. The "mossie flowers clustering thick together of a yellowish greene colour," as Gerard described them, lack petals and yet are counted among the members of the rose family by taxonomists. They have a slight perfume but not enough to attract many insects. The sprays dry well and make appealing material for winter bouquets. No description of ladys-mantle can do justice to its real appeal to the eye.

It was originally cultivated for its success in stopping bleeding and reducing bruises, and for other remarkable effects whether the leaves were applied outwardly or a decoction of the herb was taken. Nicholas Culpeper, seventeenth-century herbalist, adds this startling bit of information to his praise of it as a singular wound herb, "it is very proper for . . . such women or maids as have over great flagging breasts, causing them to grow less and hard, being both drank and outwardly applied. . . ." There are quite a few advantages to a plant which will grow in full sun or part shade, needs no winter covering or special feeding, and offers its own beauty and a beauty treatment, too.

Parsley piert, *Alchemilla arvensis*, is a close cousin of ladys-mantle, which I hope to grow sometime just for its curious name. Neither plant nor seed is available in this country. Parsley piert is smaller than *Alchemilla vulgaris*, with very small three-cleft leaves. Culpeper describes the flowers as "so small they can hardly be seen, and the seed as small as may be." The name is believed to be a corruption of parsley pierce-stone, because the herbalists found it effective in breaking up stones in the bladder. This herb has no relation to parsley (*Petrosetinum crispum*).

Culpeper has this to say about parsley piert: "Its operation is very prevalent to provoke urine, and to break the stone. It is a very good salad herb. It were good the gentry would pickle it up as they pickle up samphire for their use all winter. I cannot teach them how to do it: yet this I can tell them, it is a very wholesome herb. They may also keep the herb dry or in a syrup if they please. . . ."

RHODODENDRON DISCOVERIES (from page 100)

flowered *R. delavayi* represents the Arboreum Series in both Thailand and Indochina and that the Fortunei Series extends southward and eastward into Thailand with the discovery there of *R. serotinum*. This species, which was thought to bloom in September, is described as blooming in April. Some species in the Fortunei Series are useful in the gardens of the northeastern United States.

Rhododendrons of the spectacular yellow-flowered Lacteum Series, greatly valued in Great Britain and on the West Coast of the United States, are found in Viet Nam. Species of the Stamineum Series occur in an immense area that embraces Burma, southern China, Formosa, Indochina, and Thailand. Even a species of the primitive large-leaved Falconeri Series inhabits North Viet Nam. The persistent-leaved azaleas of the Obtusum Subseries (subgenus *Anthodendron,* section Tsutsusi, in Dr. Sleumer's treatment), familiar to gardeners as "Japanese azaleas," occur in Thailand, Laos, Viet Nam, and in the Philippines.

It is apparent for the first time that there is a gigantic overlap in the distribution of rhododendrons from their two evolutionary cradles on continental Asia and in Malaysia, and that their geographical and taxonomic relationships are different from those that we had supposed.

Dr. Sleumer has followed this revelation with the publication recently of *The Genus Rhododendron in Malaysia** in which, for the first time, the so-called Javanicum rhododendrons, primarily from Indonesia and New Guinea, and the group that we now know as the Vaccinioides Series are gathered into an orderly and logical classification under section Vireya. This monumental work provides a systematic identification of the Malaysian rhododendrons, encompassing 261 species and 55 varieties and forms, of which 96 species and 29 varieties are newly described from recent collections by members of the Archbold Expedition, by the Dutch expeditions, and by others in New Guinea, and by Eyma in the central Celebes.

It would scarcely be possible to exaggerate the significance of Dr. Sleumer's work to those with a special interest in rhododendrons. Until the present time, more than a quarter of the known species in the genus have been lost in limbo, their relationships unknown, and the whole group divorced from the remaining three-quarters of the species that inhabit the earth. Now, at last, we have an ordered identification of the Indonesian and New Guinea species in a system that encompasses all of the world's known rhododendrons. Their relationships are clarified, and the whole genus shifts into new perspective in distribution, taxonomy, and phylogeny.

For the first time we can say that there are about nine hundred and twenty-five known species of *Rhododendron* in existence, and we can assign each to its proper place in a botanical classification. A taxonomic accomplishment of the first order has been unveiled, and all rhododendron enthusiasts will welcome the enlightenment that accompanies it.

GARDEN IN THE FOREST (from page 92)

meaningful religious service under the direction of Dr. A. C. Voran.

The Foundation

In April, 1960, the Gardens were legally transferred to the A. J. and Nona Trigg Hodges Foundation.

The creation of the Gardens was the dream and achievement of A. J. Hodges and the late Mrs. Nona Trigg

Hodges, who devoted some eight years to this labor of love. Mrs. Hodges' death just shortly before the formal dedication of the project in May, 1959, set in motion the transfer of the Gardens to a non-profit foundation which had been planned by the owners for some time. Mr. Hodges, as a trustee, directs the affairs of the Gardens, now the property of the Foundation. Other trustees are Dr. J. J. Mickle, President of Centenary College, Shreveport, Louisiana, and Eugene McElvaney, Senior Vice President of The First National Bank in Dallas, Texas.

It is the desire of the founders that the formation of the Foundation will enable the continued maintenance and operation of the Gardens. Judging from the attendance over the past two years, the Gardens should be self-sustaining by 1962.

Historic Heritage

The natural scenic area of Hodges Gardens is reminiscent of the primeval forest that existed centuries before the white man strode into this area—a reminder of the impressions of early explorers who came this way, Cabeza de Vaca, Moscosco, Tonto-The-Iron-Hand, Iberville, and Bienville, all of whom paid glowing tribute to the natural beauty of the land.

Other sites in west Louisiana remind us of past eras—Los Adias, a mission built by Spanish missionaries in 1717; plantation homes on the Cane near Natchitoches; Fort Jesup where famous American generals protected American settlers; The Battle Park Museum at Mansfield, Louisiana, with its relics and memorabilia of Civil War days. As thousands come to see these relics of the past and to enjoy the beauty of flowers and trees, we know history's wheel has turned full circle in The Land of El Camino Real.

ROSE DAY

at The New York Botanical Garden

June 13, 1961

Plans for the nineteenth annual Rose Day at The New York Botanical Garden call for guided tours by experts who know their roses and can evaluate the relative merits of the modern varieties.

The tours are scheduled to start in the Rose Garden at 10 a.m., 11 a.m., 2 p.m., and 3 p.m.

The tractor train, *the Floral Flyer*, will be stationed at the Main Gate to transport visitors to the Rose Garden.

As the rehabilitation of the Museum and Administration Building is taking longer than anticipated, it is not possible to hold the usual afternoon program in the Lecture Hall.

All back issues and reprints of back issues of *Addisonia, Brittonia, Economic Botany, Memoirs of The New York Botanical Garden, Mycologia, and North American Flora* are handled exclusively by Stechert-Hafner, 31 East 10th St., New York 3, N. Y. All inquiries should be addressed to that company.

Stechert-Hafner also sells the following books published for The New York Botanical Garden at these list prices:

Britton: *Flora of Bermuda*		$10.00
Britton and Millspaugh: *The Bahama Flora*		9.50
Gleason: *Plants of the Vicinity of New York*		3.00
Gleason and Collaborators: *The New Britton and Brown Illustrated Flora of the Northeastern United States and Adjacent Canada**	3 vols.	35.00
*Family Keys from New Britton and Brown Flora**		1.00
Hagelstein: *The Mycetozoa*		7.50
Mackenzie: *North American Cariceae*	2 vols.	20.00
Keys to the North American Species of Carex		Price on request
Rydberg: *Flora of the Prairies and Plains of Central America*		8.50
Van Melle: *Review of Juniperus Chinensis et al*		1.50

*This work may also be purchased from The New York Botanical Garden. There is a handling charge of $1.00 on The New Britton and Brown Flora.

Subscriptions to the following periodicals should be sent to The New York Botanical Garden.

Addisonia, colored plates of flowering plants accompanied by non-technical descriptions; 8 plates to a part, 4 parts to a volume. Published one part annually. Free to members of the Garden; $10.00 per volume to others.

Brittonia, published quarterly for the American Society of Plant Taxonomists. Subscription included in the Society's dues $6.50 a year. $7.50 per volume to others.

Economic Botany, official organ of the Society of Economic Botany, published quarterly. Members' subscription included in Society's dues $7.50 a year. Subscription to non-members $8.00 a year.

Memoirs of The New York Botanical Garden, scientific papers by members of the staff and collaborators; issued irregularly. Vol. 10, $10.00. Prices of earlier volumes on request.

Mycologia, official organ of the Mycological Society of America, published bi-monthly. Members' subscription included in Society's dues $8.00 a year. Subscription to non-members $8.50 a year.

North American Flora, descriptions of the wild plants of North America, including Greenland, the West Indies, and Central America. 100 parts issued; now in 2nd series. Prices of parts on request.

The Garden Journal, non-technical articles on botanical, horticultural, and kindred subjects, published bi-monthly. Free to members of the Garden. Subscription $3.00 a year (foreign $3.50) to others.

Back issues of The Garden Journal, 75¢ each, and of The Journal of The New York Botanical Garden, 50¢ each, are available from The Garden.

THE NEW YORK BOTANICAL GARDEN
BRONX PARK NEW YORK 58, N. Y.

The Library of The New York Botanical Garden

At a meeting on January 31, 1961, of the Women's Council of The New York Public Library, Mrs. John E. Parsons spoke on The New York Botanical Garden; Mrs. John Nicholas Brown on the John Carter Brown Library in Providence, Rhode Island; Mrs. John G. McCarthy on the American library in Paris; Mrs. John De Witt Peltz on the London Library on St. James' Square, London; and Mrs. Arnold Whitridge on the Gennadeion Library in Athens. Mrs. Parsons is the Chairman of the Advisory Council of The New York Botanical Garden.

Mrs. Parsons' talk follows:

A botanical garden, as distinguished from a private garden such as yours and mine, has three distinct entities. Like ours, it has the outdoor and indoor plantings, though on a majestic scale. Unlike ours, it needs an herbarium and, above all, a very large library to be effective. An herbarium is a collection of dried and mounted specimens of plants, invaluable for record and further identification, and presenting many custodial problems.

However, it is of The New York Botanical Garden Library that I would speak this morning. It ranks among the three foremost research collections of botanical and horticultural books in the Western Hemisphere. The other two of like quality are at Harvard University and at the United States Department of Agriculture in Washington, D. C., though neither perhaps is as compactly housed as ours under one roof.

Its founding was rather late. In 1896, the Trustees of Columbia University agreed to deposit with The New York Botanical Garden, upon request and on loan, their entire botanical library of some five thousand bound volumes. These, added to the twenty-five hundred books already on hand, made a substantial nest-egg. The loan of the five thousand volumes from Columbia is an indefinite one by agreement and not, as is some times the sad case between friends, a casual one. Many Columbia students, doing their graduate work in botany, are expected to study at the Garden's Library.

Later, choice and small collections were attracted here as by a magnet. For instance, Dr. David Hosack's botanical books were acquired sixty years ago through the New York Academy of Medicine which, even at that date, described them as "rare, and difficult to obtain."

Yet the backbone of the Library lay rather in purchases than in gifts or loans. In 1910 Dr. John Henry Barnhart, the first bibliographer, made notable acquisitions abroad. In 1923, several libraries were consolidated at the Botanical Garden in Geneva, Switzerland, and The New York Botanical Garden had the means, at that moment, to buy many of the duplicates.

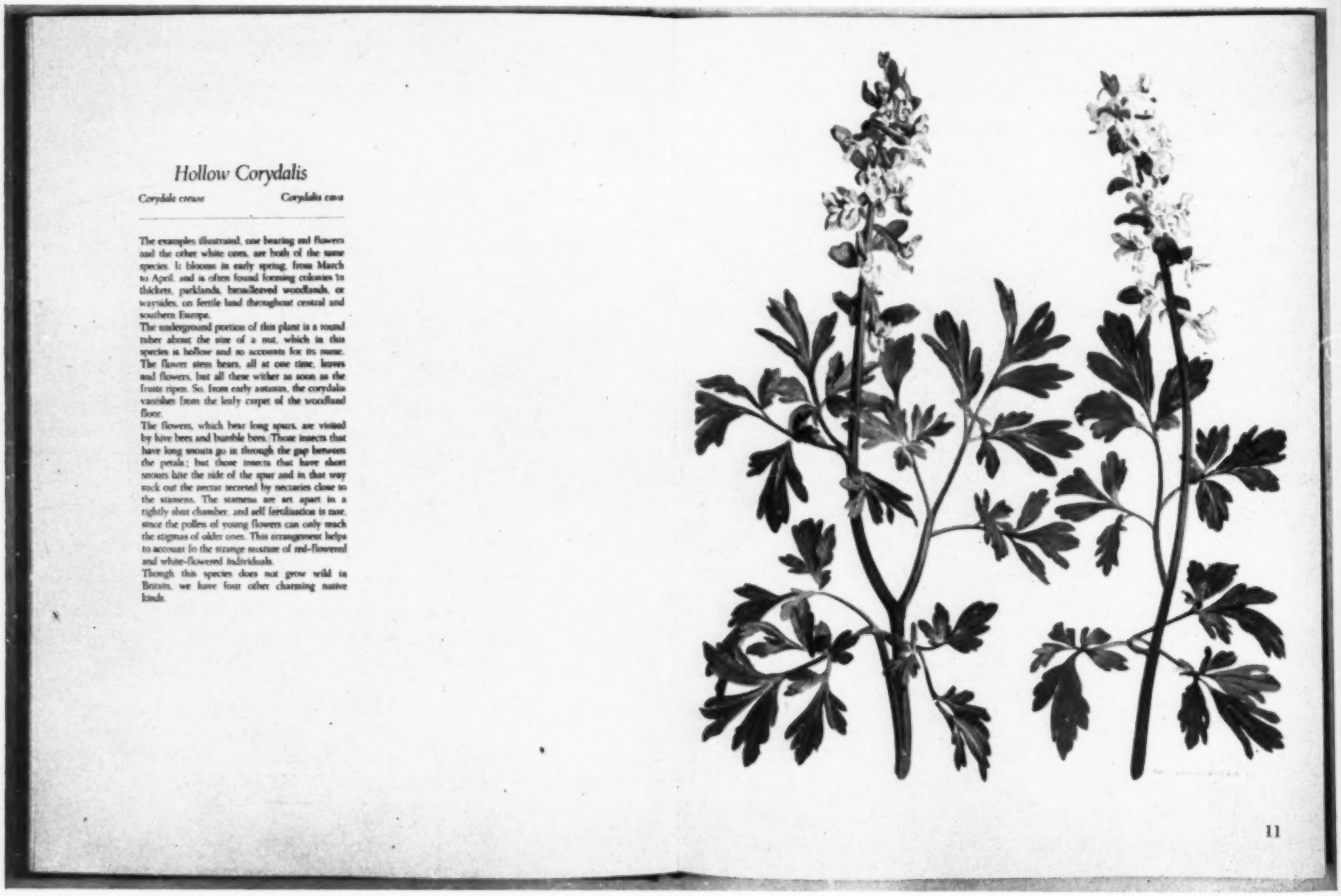
Today the bound volumes number over sixty-five thousand and the unbound pieces three hundred thousand or more. They have been housed, up to the present time, under the dome of a building that only Mr. Steinberg could have invented. I personally love such architecture. In all honesty it must be declared treacherously airy and even rainy. So the Board of Managers and the City plan a new and appropriate wing to house the Library. The domed building is to remain for many other uses. The substantial new library wing will grow at the back, where dust and damp cannot corrupt (what with the air-conditioning), nor the Steinbergian architecture be spoiled. Hopefully, we shall break ground this autumn.

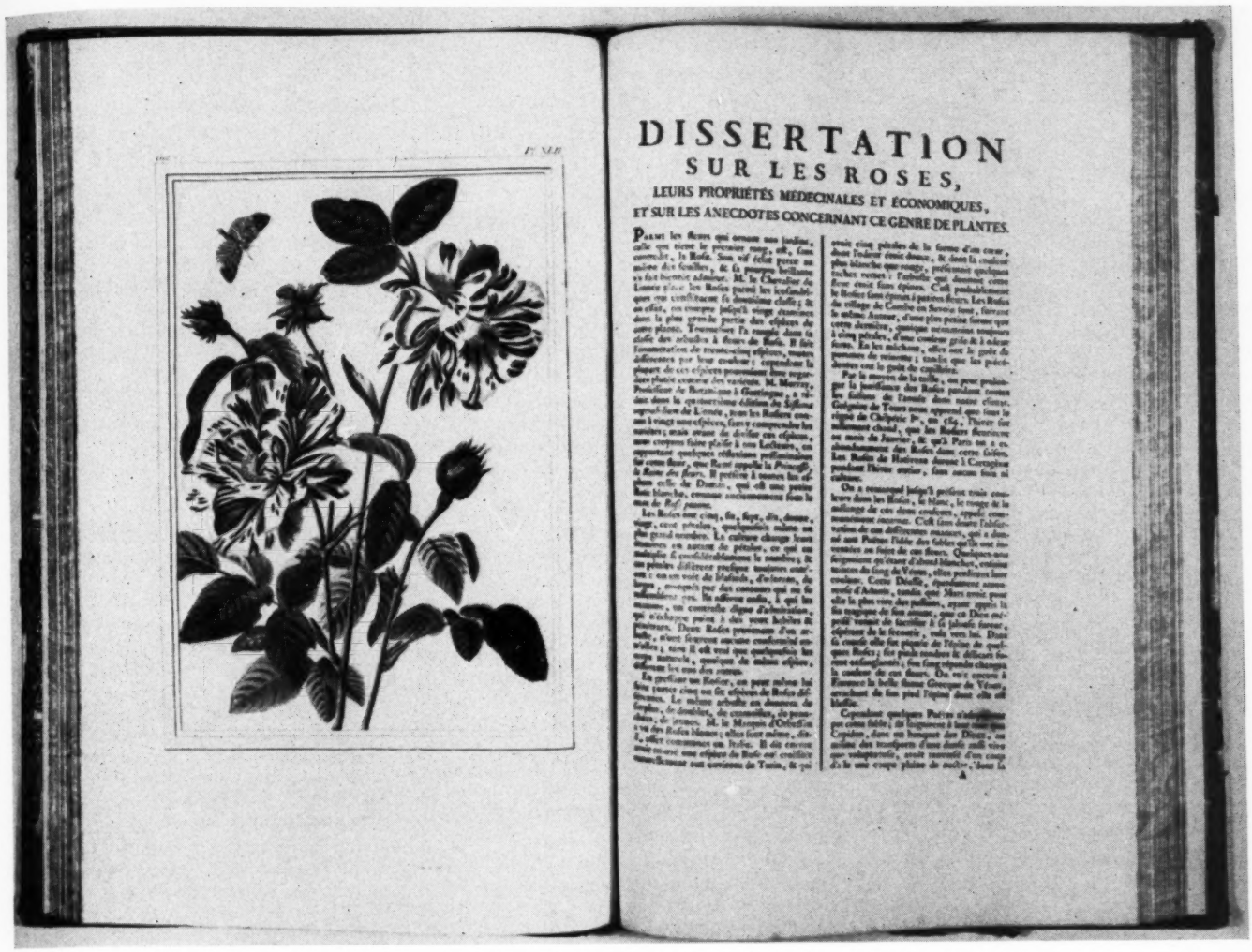
What sort of books comprise a botanical library? The treasures are, largely, the herbals. An herbal is quite simply "a treatise on herbs or plants," though for earlier times, say prior to 1700, it usually meant medicinal herbs and how to use them for your health. Six of these, printed before 1500, fall into that lovely category called incunabula. Manuscript letters are valued, too; for example, those that John Torrey received from leading botanists in the mid-eighteen hundreds. Finest in this country are the books by and relating to Darwin and Linnaeus.

Illustrated Flora, both British and French, are among the handsomest treasures. A few of these have been selected and brought here today for you to see by Elizabeth C. Hall, who is the Sarah Gildersleeve Fife Research Librarian at the Garden. The staff, in addition to Miss Hall, consists of Dr. Harold William Rickett, Bibliographer, and the Administrative Librarian James J. Daly, and three assistants.

Among the books in constant use are Pritzel's *Thesaurus of Botanical Literature*. With German thoroughness this was published in Leipzig in

From *Flowers in Color*—sixty plates in ten colors after the originals by Hans Schwarzenbach. Text by Prof. W. Rytz, translated and adapted by H. L. Edlin. Viking Press, New York, 1960.


Hollow Corydalis
Corydalis cretae
Corydalis cava
The examples illustrated, one bearing red flowers and the other white ones, are both of the same species. It blooms in early spring, from March to April, and is often found forming colonies in thickets, parklands, broadleaved woodlands, or waysides, on fertile land throughout central and southern Europe.
The underground portion of this plant is a round tuber about the size of a nut, which in this species is hollow and so accounts for its name. The flower stem bears, all at one time, leaves and flowers, but all these wither as soon as the fruits ripen. So, from early autumn, the corydalis vanishes from the leafy carpet of the woodland floor.
The flowers, which bear long spurs, are visited by hive bees and bumble bees. Those insects that have long snouts go in through the gap between the petals; but those insects that have short snouts bite the side of the spur and in that way suck out the nectar secreted by nectaries close to the stamens. The stamens are set apart in a tightly shut chamber, and self fertilisation is rare, since the pollen of young flowers can only reach the stigmas of older ones. This arrangement helps to account for the strange mixture of red-flowered and white-flowered individuals.
Though this species does not grow wild in Britain, we have four other charming native kinds.
11



DISSERTATION
SUR LES ROSES,
LEURS PROPRIÉTÉS MÉDECINALES ET ÉCONOMIQUES,
ET SUR LES ANECDOTES CONCERNANT CE GENRE DE PLANTES.

From *Nouveau Traité . . . De Toutes Les Plantes,* Vol. I, by Pierre Joseph Buchoz, Paris, 1787.

1872. The Royal Horticultural Society's *Index Londinensis to Illustrations* is another important "reference tool."

A complete file of United States Plant Patents (there are now 2,011 of these) is often consulted, as well as the picture collection of about fifty thousand. Also very useful indeed are the seed and nursery catalogues from the eighteenth century to date.

Exchanges provide a web of information and good-will around the world. *The Garden Journal,* for instance, is exchanged for similar journals from Fiji, South Africa, Madagascar, and Jamaica, to mention only four out of hundreds.

Who uses a botanical and horticultural library? There were six thousand reference problems during 1958. Questions came from botanists and biologists, graduate students, college teachers, and visiting investigators, from City, State and Federal Agencies; from magazine publishers, movie directors, from those who edit encyclopedias and those who draw, paint, write, or advertise, to name only a few. Hardly a day goes by that a letter of inquiry does not come from drug companies—from Squibb or Ciba or Merck—or from one of the large wholesale perfume houses.

A large number of users were amateur botanists and gardeners, florists, and nurserymen.

Telephoned questions alone ran to 2,597 calls last year. What sort of questions are asked? Here are a few:

"At what period do the principal hayfever plants flower? Where can I go to escape them?"

"Does 'the man-eating tree of Madagascar' really exist?"

"What plant is the true shamrock?"

I am sure you will be happy to know that New York City's Health Department has a section called "New York City Poison Control." They frequently consult the Garden's Library. Itching powder is sold illegally in shops that specialize in "jokes." "What is the main ingredient of itching powder?" City Poison Control wanted to know.

"What flowers are protected by law in New York State?"

A group said, "We are laying out a church garden. What Bible plants can we grow, and where can we buy them?"

All these questions were answered, except the one about the shamrock, which is controversial as are so many lovely Irish things.

I hope you will all visit the Library of The New York Botanical Garden. It is there for your use, and a most hearty welcome to every one of you.

FANNY WICKES PARSONS

REVIEWS OF RECENT BOTANICAL BOOKS

THE GEOLOGICAL EVOLUTION OF NORTH AMERICA (A regional approach to Historical Geology). Clark, Thomas H. and Colin W. Stearn. vi and 434 pages, illustrations, indexed. The Ronald Press Co., New York. 1960. $7.50

Books of this nature are traditionally entitled "Historical Geology". The authors, both professors at McGill University, Montreal, Canada, succeeded in breaking through the time-worn college-text facade to present a refreshing approach to the origin of our landscape and its life. Since research in historical geology is tedious, and the results are slow in their acceptance and incorporation in standard texts, the drastically revitalized approach in this well-illustrated work should go far to stimulate prospective students.

The five principal parts are subdivided into chapters of fundamental importance for North America, omitting excessive detail common to former texts, material that should be reserved for advanced study in stratigraphy and evolution. The introductory chapters on the earth

BOOKLETS

Catalog of Hardy Trees and Shrubs, a list of the woody plants grown outdoors at the Garden in 1942. Illus. Price 75¢ per copy.

Hardy Ferns and Their Culture. Illus. Price 25¢ per copy.

Flora of the Unicorn Tapestries. Illus. Price 25¢ per copy.

Food and Drug Plants of the North American Indians. Price 25¢ per copy.

Montgomery Conifer Collection, non-technical descriptions of conifers with information on history, habitat, and usage. Illus. Price 50¢ per copy.

Plants of the Holy Scriptures. Price 25¢ per copy.

Succulent Plants of New and Old World Deserts. Illus. Price 50¢ per copy.

Vegetables and Fruits for the Home Garden. Price 25¢ per copy.

Also reprints of well-illustrated, step-by-step articles on different garden techniques, written and photographed by T. H. Everett, Assistant Director (Horticulture): "Lawn Verges," "How to Force Dutch Bulbs" (in the home), "Some Sources of Humus," "Tree Pruning Pointers," "Sowing Seeds in Flats," "How to Transplant," "Some Fall Gardening Work" (i.e. heeling in, root cuttings, bulbs in pebbles), "Winter Protection of Plants."

10¢ each — any 6 reprints 50¢

The above booklets and reprints are obtainable from The New York Botanical Garden

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in the universe, the geosynclinal theory, and epeiric seas of the stable interior incorporate findings of the latest research in these fields. A thorough evolution of the Appalachian and Cordilleran geosynclines is developed, showing that these features have structurally and physiographically dominated the continent since early Paleozoic history. A fine section on the Canadian shield or the continental nucleus, the Arctic islands, and the ice age is particularly timely in view of the recent surge of Arctic exploration. A separate section devotes considerable space to the evolution of plant and animal life with an understandable stress on ancient fauna, and the history of man. The accepted evolutionary sequence is appended, and a simplified classification of the organic world elucidates the taxonomic question. Selected references acquaint the reader with important basic literature. Excellent illustrations and revealing diagrams reflect recent techniques of aerial photography.

HERMAN F. BECKER

ILLUSTRATED GENERA OF WOOD DECAY FUNGI. Fergus, Charles L. 132 pages, illustrated. Burgess Publishing Company, Minneapolis, Minnesota. 1960. $4.00

This manual provides an excellent aid for the identification of fungi that cause decay of slash, timber, and wood. Identification is accomplished by use of well-written keys to ten families and eighty-five genera of wood decaying fungi, eighty-one of which are illustrated with a photograph of a specimen of a representative species. Descriptions are presented for each genus; and for some of the more important genera, keys to species are included. The non-technical language of the keys and descriptions and the good black and white photographs and diagrammatic drawings make the manual a handy tool for the forester, naturalist, and student who need to identify both the harmful and beneficial fungi associated with wood and slash decay. A brief introduction, explanation of the keys, and directions for collection of wood decaying fungi are included.

CLARK T. ROGERSON

WEED CONTROL HANDBOOK. Woodward, E. K., Ed. Second Edition. 264 pages, illustrated, indexed. Blackwell Scientific Publications, Ltd., Oxford. 1960. $4.50

The rapid advances in chemical control of weeds makes any book on this subject out-of-date in a relatively short while; the present volume appeared only two years after the first edition. This highly technical book is not for amateur gardeners, but for manufacturers of weed-controlling chemicals, and for research and regulatory workers in the field. Many of the chemicals mentioned and the weeds controlled by them are found chiefly in the British Isles.

P. P. PIRONE

PLANT LIFE OF WEST VIRGINIA. Core, Earl L. 224 pages, illustrated, indexed. Scholar's Library, New York. 1960. $6.00

This is "an attempt to provide for the average citizen a survey of the salient features of the plant life of West Virginia." It includes, among other things, line drawings of many common plants of the state, from green algae to composites. It should appeal especially to those who have been exposed to some of the basic botanical concepts and terminology but who are not professional botanists.

ARTHUR CRONQUIST

FOREST AND SHADE TREE ENTOMOLOGY. Anderson, Roger F. 428 pages, illustrated, indexed. John Wiley and Sons, Inc., New York. 1960. $8.50

This is an excellent, well-planned book that combines basic entomology with the life cycle of and control measures for specific insects. Especially useful to student entomologists are keys to identification of the more common pests. Instructors will like the large number of selected references after each chapter, or after specific insects.

The major part of the book covers the following important groups: foliage-eating insects, inner-bark borers, wood borers, sapsucking insects, twig-, bud-, and seedling-damaging insects, root-infesting insects, and cone and seed borers. Although primarily a book on forest entomology, commercial arborists, nurserymen, shade-tree superintendents, and other tree-maintenance workers will find valuable information in its pages.

P. P. PIRONE

ADVENTURES IN ECOLOGY. Clements, Edith S. 244 pages, illustrated. Pageant Press, Inc., New York. 1960. $5.00

Mrs. Clements in a delightfully informal style faithfully presents a detailed account of early forays in the United States, undertaken as companion and assistant to her scientist husband Dr. Frederic E. Clements—forays which made ecological history. Excellent photography aptly illustrate the principles of ecology and occasional pen and ink sketches amusingly point up the hazards of field tripping in those decades, whether by burro or Buick. It is to be regretted that a better grade of stock was not used from the standpoint of both photographs and text.

Events leading to the founding of the pioneer Alpine Laboratory on Pike's Peak, Colorado, are chronicled, and Dr. Clements' deductive methods of teaching are heavily underscored. The person who encounters ecology for the first time in these pages will ever after be more aware of the impact of environment on plant life. One closes the book with the feeling that, in addition to being pleasantly informed, it has been a privilege to have had a glimpse into the lives of two very fine people, both dedicated to an ideal—ecology.

CAROLINE K. ALLEN

TREES, SHRUBS AND WOODY VINES OF THE SOUTHWEST. Vines, Robert A. 1104 pages, illustrated, indexed, glossary, bibliography. University of Texas Press, Austin, Texas. 1960. $25.00

This is a massive, six-pound tome treating the woody plants of Texas, New Mexico, Oklahoma, Arkansas, and Louisiana. Each of more than twelve hundred species is fully described and attractively illustrated. The sequence of families in Englerian; the arrangement within the families is alphabetical. There are no keys. The author tends to follow authoritative opinion, rather than attempting an independent taxonomic evaluation of critical groups. The book should be useful to foresters, conservationists, county agents, and amateur botanists.

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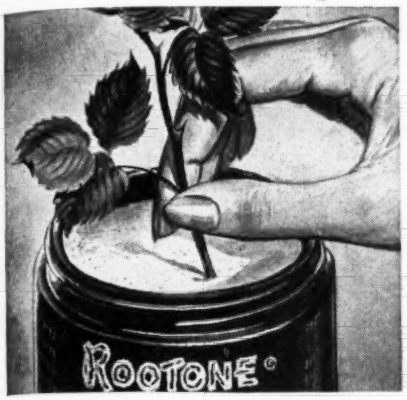

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THE BIOLOGY OF WEEDS. Harper, John L., Ed. 256 pages, illustrated. Charles C. Thomas, Springfield, Illinois. 1960. $9.75

This book consists of a series of separate, individually interesting scientific papers which have in common only the fact that they deal with weeds. There is something for everybody, including taxonomists, ecologists, physiologists, evolutionary theorists, and those concerned with practical problems of weed control.

ARTHUR CRONQUIST

ILLUSTRATED GENERA OF IMPERFECT FUNGI. Barnett, H. L. Second edition. 225 pages, illustrated. Burgess Publishing Company, Minneapolis, Minnesota. 1960. $4.50

This manual, first published in 1955, has been expanded to include 462 genera of the imperfect fungi, a fifty per cent increase over the previous edition. For each genus a brief description and diagrammatic drawing of a representative species are given. Also included are an extensive key to the genera, an adequate list of references, and an index to genera. The keys are well-written, the descriptions are concise, and the diagrammatic drawings are helpful aids to identification. The manual is intended primarily for the student who wishes to identify the common imperfect fungi that are of so much economic importance in agriculture, industry, and medicine.

CLARK T. ROGERSON

MICROBIOLOGY. HISTORICAL CONTRIBUTIONS FROM 1776 TO 1908. R. N. Doetsch, Ed. xii + 233 pages, illustrated. Rutgers University Press, New Brunswick, New Jersey. 1960. $5.00

Professor Doetsch collected English translations of some of the significant publications in the history of bacteriology (not, as his title suggestions, of microbiology) from Spallanzini to E. F. Smith. He has prefaced each paper with an elementary biography of the author. If it is assumed that merely reading the papers of great scientists is a salutory method of teaching science, this book has some merit.

RICHARD M. KLEIN

ATLAS OF BACTERIAL FLAGELLATION. Leifson, Einar. 171 pages, illustrated, indexed. Academic Press Inc., New York. 1960. $7.00

Flagellation is a major basis for identification and classification of bacteria. The Atlas covers the shape and arrangement of the flagella on representative strains of all available species. Good photomicrographs illustrate normal and mutational flagellar shapes and arrangements.

The first four chapters deal briefly with cytological techniques, terminology describing the arrangements of flagella, variation and mutation of flagellar shape, and bacterial evolution with respect to flagellation.

It would be most welcome if future revisions of the Atlas would include a chapter on the ultrastructure of flagella and electromicrographs, and photomicrographic enlargements were specified in the legends. ELSA H. J. O'DONNELL

BRIEF NOTES ON RECENT BOOKS

By ELIZABETH C. HALL

Miss Hall is Sarah Gildersleeve Fife Research Librarian of The New York Botanical Garden.

ART, FLOWER ARRANGEMENTS AND HOLIDAYS

THE CHRISTMAS TREE; AN EVERGREEN GARLAND FILLED WITH HISTORY, FOLKLORE, SYMBOLISM, TRADITIONS, LEGENDS AND STORIES. Foley, Daniel J. 159 pages, illustrated, part colored, bibliography, indexed. Chilton Co., Philadelphia, Pa. 1960. $3.50

The title of this book describes the contents —a veritable Christmas encyclopedia with fascinating illustrations, old and new. Painstaking research was necessary to produce such a comprehensive, useful, and attractive volume.

CHRYSANTHEMUMS INDOORS. Bayles, Vera T. 92 pages, illustrated, indexed. Hearthside Press, New York, 1960. $3.50

Primarily devoted to chrysanthemums in flower arrangements, corsages, potted plants for ornament and flower show exhibits; brief notes on Bonsai and Cascade culture.

DECORATIVE ALPHABETS AND INITIALS. Nesbitt, Alexander, ed. unpaged, illustrated, bibliography. Dover Publications, New York, N. Y. 1960. $2.25

Ornamental letters selected from ancient manuscripts and rare books, with historical notes. Dr. Nesbitt is Associate Professor at the Rhode Island School of Design.

DRIFTWOOD IN THE HOME. Schaffer, Florence M. 128 pages, illustrated, indexed. Hearthside Press, New York. 1960. $3.95

Since 1957, when Mrs. Shaffer's *ABC of Driftwood for Flower Arrangers* was published, there has been an increasing interest in decorating with "driftwood" objects. The term "driftwood" is now applied to numerous types of wood which has been weathered by sun, wind, rain, ocean wave, tornado, and sand storm. In the present book there are extensive notes on treating and finishing different kinds of wood and detailed discussion of each of the one hundred and ten arrangements illustrated by photographs.

HANDBOOK OF PLANT AND FLORAL ORNAMENT SELECTED FROM THE HERBALS OF THE SIXTEENTH CENTURY. . . Hatton, Richard G. 539 pages, illustrated, indexed. Dover Publications, New York. 1960. $2.98

An unabridged republication of the formerly titled *The Craftsman's Plant-Book; or Figures of Plants*, originally published in 1909. A remarkable collection of over twelve hundred plant drawings arranged according to plant families. Informative text on the use of plant form in design.

HOLIDAY AND PARTY TABLE SETTINGS. Schulke, Zelda W. 121 pages, illustrated, part colored, indexed. Hearthside Press, New York, N. Y. 1960. $4.50

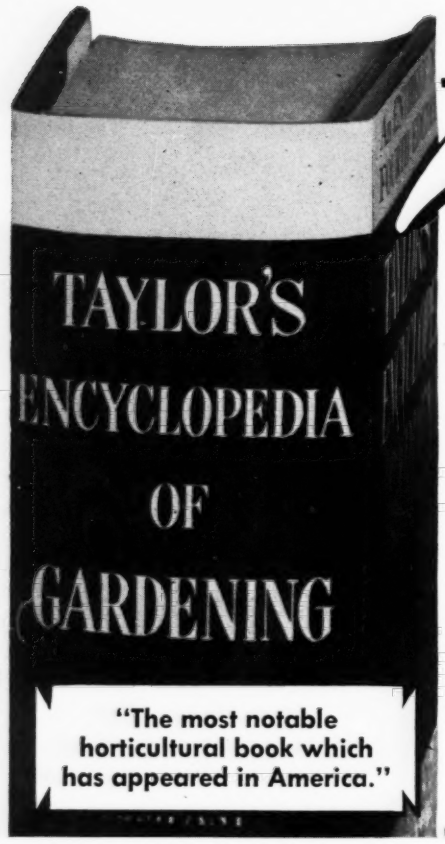
Suggestions for all sorts of occasions—holidays, anniversaries, bon voyage parties, buffets, and indoor and outdoor settings. Many clever ideas.

THE NEW CHRISTMAS MAKE-IT BOOK. Baer, Barbara. 96 pages, illustrated. Hearthside Press, New York, N. Y. 1960. $2.95

Hundreds of suggestions—drying of roadside and garden flowers for winter arrangements and for Christmas cards, making terarriums and miniature gardens, and so on.

SIMPLIFIED FLOWER ARRANGEMENTS. Roberts, Patricia E. 134 pages, illustrated, part colored. Viking Press, New York, N. Y. 1960. $5.00

Mrs. Roberts, formerly associated with the Constance Spry Shop in New York City, gives instructions in the mechanics and techniques of making over fifty arrangements which she has illustrated with photographs. A flower chart, tabulating color, shape, size, and seasonal availability in the garden and florist's shop is a handy feature.



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2 Park Street, Boston 7, Mass.

THE STYLES OF ORNAMENT. Speltz, Alexander. 647 pages, illustrated, bibliography, indexed. Dover Publications, New York, N. Y. 1960. $2.25

3,765 illustrations of ornamental designs arranged in chronological sequence from prehistoric times to the early nineteenth century. Of particular interest to the botanically minded are the sections on Egyptian art with figures of the palm tree and papyrus; Gothic flora with conventionalized figures of arum, lily, bellflower, parsley, fig, maple, and grape; the lotus in Indian design; and the stylized tulips in the wall tiles of Delft.

Conservation And Miscellaneous Writings

THE BALANCE OF NATURE. Milne, Lorus J. and Margery Milne. 329 pages, illustrated, bibliography, indexed. Alfred A. Knopf, New York, N. Y. 1960. $5.00

A most revealing account of the increase and decrease of animal and plant populations brought about by destructive and constructive man, and written in a vivid, readable style.

NATURE AND MAN. Hillaby, John. 64 pages, illustrated, bibliography, indexed. Roy Publishers, New York, N. Y. 1960. $2.95

Mr. Hillaby is a Yorkshireman, a naturalist, and a European correspondent of *The New York Times*. Through his extensive travels in many countries of the world, he has become aware of the tremendous struggle among man, animals, and plants. This little book offers a great deal in ecology, conservation, botany, and zoology.

THE SEPARATION OF THE FARM BUREAU AND THE EXTENSION SERVICE; POLITICAL ISSUE IN A FEDERAL SYSTEM. Block, William J. (Illinois Studies in the Social Sciences: vol. 47) 304 pages, bibliography, indexed. University of Illinois press, Urbana, Ill. 1960. paper: $4.00; cloth: $5.00

A study of the conflict covering the period from 1939 to the present, well-documented.

SERVE BY CONSERVING; THE WORLD PROBLEM OF CONSERVATION. Cox, Jack, comp. 157 pages, illustrated. International Publications Service, New York, N. Y. 1959. $3.25

An international view of conservation with special emphasis on the ways and means in which Boy Scouts can and are helping to conserve wild-life and natural resources. Mr. Cox, who is Assistant County Commissioner (Boy Scouts) of London was commissioned by The Boy Scouts' International Bureau to compile this very informative manual.

THIS IS THE AMERICAN EARTH. Adams, Ansel and Nancy Newhall. 89 pages, illustrated. Alfred Knopf, New York, N. Y. 1960. $15.00

Magnificent photographs of our country out-of-doors, mostly by Ansel Adams, with poetic-prose text by Nancy Newhall. A fervent plea to conserve these scenic treasures. We are indebted for publishing this superb work to the Sierra Club, founded by John Muir in 1892.

For Young Readers

SACAJAWEA; GUIDE TO LEWIS AND CLARK. Seibert, Jerry. 192 pages, illustrated, Houghton Mifflin Co., Boston, Mass. 1960. $1.95

Boys and girls who like adventure stories will enjoy this exciting account of the Shoshoni girl guide who accompanied the explorers, Lewis and Clark, on their journey over the Rockies to the Pacific Coast.

SCIENCE ON THE SHORES AND BANKS. Cooper, Elizabeth K. 187 pages, illustrated, indexed. Harcourt, Brace and Co., New York, N. Y. 1960. $3.25

Mrs. Cooper's previous book, *Science in Your Own Back Yard"* won the Thomas Alva Edison Foundation Award as the best science book for children published in 1958.

SEEDS ARE WONDERFUL. Foster, Willene K. and Pearl Queree. 32 pages, illustrated. Carl J. Leibel, Puente, Cal. 1960. $2.50

Easy reading about seeds with plenty of pictures.

SMALL PETS FROM WOODS AND FIELDS. Buck, Margaret Waring. 72 pages, illustrated, bibliography, indexed. Abingdon Press, New York, N. Y. 1960. paper: $1.75; cloth: $3.00

Here are the answers to the young naturalist's questions: how to make terrariums, vivariums, cages; how to catch and hold and feed insects, birds, small mammals, toads, frogs. Exceptionally well illustrated by the author.

SO YOU WANT TO BE A SCIENTIST. Nourse, Alan E. 182 pages, illustrated, indexed. Harper and Bros., New York, N. Y. 1960. $3.00

A useful vocational guide with emphasis on biology, mathematics, chemistry, and physics. By the author of *So You Want To Be a Doctor* and *So You Want to Be a Lawyer*.

A TREE IS A PLANT. Bulla, Clyde Robert. unpaged, illustrated, part colored. Thomas Y. Crowell Co., New York, N. Y. 1960. $1.95

A picture story of the life of an apple tree, for the little tot.

THE TRUE BOOK OF PLANT EXPERIMENTS. Podendorf, Illa. 48 pages, colored illustrations. Children's Press, Chicago, Ill. 1960. $2.00

Simple things to do at home such as: the game of Touch-and-Tell, sowing seeds on blotting paper, growing a sweet potato vine, planting a terrarium, and making spore prints. Ages seven to nine.

WATER FOR THE WORLD. Helfman, Elizabeth S. 213 pages, illustrated, bibliography, indexed. Longmans, Green and Co., New York, N. Y. 1960. $3.75

For those in their early teens, a fascinating account of water in its many aspects from ancient history to the present day. The story involves droughts, floods, primitive and modern irrigation, the manifold uses of water in peace and war, its symbolic meanings in legends and rituals, and finally, the vital importance of conservation.

(Continued on Inside Back Cover)

NEWS, NOTES and COMMENTS

Recent activities of the Director and Staff. Dr. William C. Steere, Director, attended meetings of the Council for the Advancement of Science Writing, at Princeton, N. J., a meeting of the Commissioner of Education's Committee on Museum Resources in Albany, N. Y., the luncheon of the Garden Club of America during the week of the International Flower Show, and the Awards Dinner of the Garden Club of America.

T. H. Everett, Assistant Director (Horticulture) and Senior Curator of Education, gave a talk before the Federated Garden Clubs of New York State, Inc., held in the Metropolitan Museum of Art in New York; was guest speaker at the annual dinner of the American Dahlia Society, held in New York; and addressed the Staten Island Institute of Arts and Sciences, which is establishing an arboretum at Wagner College on the Island.

Dr. Harold Rickett, Bibliographer and Senior Curator of the Library, concluded the Downtown Lecture Series, sponsored by the Volunteer Associates of The New York Botanical Garden, with his illustrated talk on "Inside Flowers." He spent a week in research at the United States National Herbarium, Smithsonian Institute, Washington, D. C.

Dr. Bassett Maguire, Head Curator and Coordinator of Tropical Botany, will leave shortly for a four to six-week collecting trip in the southern part of the Pakaraima Mountains in British Guiana on the borderline of Brazil. Another expedition will work in and around Amapó, Brazil. There will be two areas of operation; one with Dr. Murça Pires, Chief of the Botanical Section at the Instituto Agronômico do Norte, and the other with Dr. Walter Egler, Director of the Museu Goeldi. Dr. Howard Irwin, Research Associate, will lead this expedition; it will start from the Garden the last week in June.

Dr. P. P. Pirone, Senior Plant Pathologist, talked about dormant spraying on Ruth Alampi's program, "Around the House and Garden," on NBC. A tree has been named after Dr. Pirone— *Fraxinus excelsior* 'Doctor Pirone'. Developed by Edward H. Scanlon and Associates of Olmstead Falls, Ohio. It is an outstanding street tree with strong upsweeping branches and glossy foliage. It will grow thirty-five feet tall.

An account of Dr. Pirone, with his photograph, appears in *Leaders in American Science*, fourth edition.

Dr. Arthur Cronquist, Curator, spent considerable time during January, February, and March in the Gray and Arnold Arboretum Herbariums of Harvard University, pursuing his research on the intermountain flora.

Dr. Clarke T. Rogerson, Curator of Cryptogamic Botany, attended the conference on Medical Mycology at the New York Academy of Medicine in New York on March 16-17, 1961. Dr. Rickett and Dr. Annette Hervey, Senior Research Associate, also attended the Conference. The banquet honored Dr. Bernard O. Dodge, Dr. Rhodda Benson, and Dr. Joseph Gardner Hopkins.

Dr. Richard M. Klein, Alfred H. Caspary Curator, attended a meeting of the Council of the Society for Cell Biology in New York.

Sister Mary Richardis Schultz, a graduate student from Fordham University, is doing research in Dr. Klein's laboratory to determine why light inhibits the germination of *Phacelia tanacetifolia*. She has received a National Science Foundation grant for an intermediate fellowship.

Dr. Marjorie Anchel, Senior Research Associate, Dr. Nalini N. Valanju, Research Associate, and Dr. Trevor C. McMorris, Research Associate, took the four-day course offered by Perkin Eler Corp., at Norwalk, Connecticut, on the infra-red instrument in Dr. Anchel's laboratory. Dr. Anchel, Dr. Valenju, and Dr. McMorris attended a meeting of the Plant Chemists Society held recently at Columbia University. Dr. McMorris presented a paper on "Investigations on Illudin," which he and Dr. Anchel prepared.

Miss Hall, Sarah Gildersleeve Fife Research Librarian, lectured before the New York Unit of the Herb Society of America on "Herbs I Had Seen While Abroad"; and on "Fragrance in the Garden" before the Garden Club of Teaneck, N. J.

Dorothy Ebel Hansell, Editor of *The Garden Journal*, attended meetings of the Garden Writers Association of America, the International Geranium Society, and the National Association of Gardeners which were held in New York during the week of the International Flower Show.

The Hon. Thomas C. Desmond was among the medal recipients at the Medal Awards Dinner of The Garden Club of America, held at the Colony Club in New York on April 11, 1961. He was presented with the Eloise Payne Luquer Medal for special achievement in the field of botany. Dr. William C. Steere, Director of The New York Botanical Garden, received the medal on behalf of Mr. Desmond, a member of the Garden's Board of Managers. Mr. and Mrs. Desmond had not returned from their cruise around the world.

The National Science Foundation has given a grant of $18,200 to The New York Botanical Garden for the preparation and publication of an international plant index, using punch cards and data processing machines. Sydney W. Gould, Research Associate, is the principal investigator. He will carry on much of his work at the Connecticut Agricultural Station, the co-sponsor of this project. Mr. Gould is an authority on machine tabulations in other fields and will apply the processing methods that he has been working on for ten years, to plant classification. In the past year he prepared thirty-five thousand punched cards in a pilot test of the methods to be used. This test indicated that automatic compilation can be done in a fraction of the time it would take researchers working without machines. The aim of the program is to record some 1,700,000 plant names by genera and species in preparation for their publication by plant families. Cross indexes will make the information useful to researchers in many fields.

The National Science Foundation has awarded a three-year grant of $15,200 to The New York Botanical Garden for investigation on and publication of *Flora Iranica*, that is, the flora of the Iranian Highlands including Persia, Afghanistan, West Pakistan, and the bordering mountain ranges that fall within the territories of Iraq, Palestine, and Soviet Russia. The principal investigator is Prof. Dr. Karl H. Rechinger, who has been in charge of the herbarium of the Natural History Museum in Vienna for more than thirty years. The New York Botanical Garden will support Dr. Rechinger's research through plant specimens and literature, by serving as a central liaison institution with other American institutions, and by serving as admin-

The rock garden, exhibited by The New York Botanical Garden at the International Flower Show, New York, March, 1961, was awarded the gold medal of the Massachusetts Horticultural Society and the New York Florists' Club trophy; also a trophy from the International Flower Show for the best designed pool and waterfall.

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The National Science Foundation has awarded The New York Botanical Garden a grant of $4,000 for the support of "Publication of Part I of *A Manuel of the Leafy Hepaticae of the West Indies, Mexico, Central and South America* by Margaret Fulford, under the direction of Dr. Harold William Rickett, Editor of the Garden's 'Memoirs.'" The one-year grant became effective February 20, 1961.

Dr. William J. Robbins. Director Emeritus of The New York Botanical Garden, was recently presented with the Silver Achievement Medal of the Federated Garden Clubs of New York State, Inc., for his long and distinguished career as a plant physiologist, for the degrees he has attained, the offices he has filled in botanical and scientific societies, the positions he has held at important institutions, and for his many scientific publications.

Visitors to the Garden. The following have visited The New York Botanical Garden during recent months.

Dr. Margarita Silva and
Dr. Elizabeth Haven, College of Physicians and Surgeons, Columbia University, New York, N. Y.
Dr. Gilbert Dallderf, Sloan-Kettering Institute for Cancer Research, New York, N. Y.
Dr. Brenda F. Slade, Botany Dept., Otago University, Dunedin, New Zealand.
Dr. D. Marien and
M. K. Heckt, Biology Dept., Queens College, Flushing, N. Y.
M. Chessin, Botany Dept., Montana State University, Missoula, Mont.
Margarita Hahn Vidal and
Manuel Eduardo Vidal Couce, Buenos Aires, Argentina.
Rev. James L. Harley, S. J., Georgetown University, Washington, D. C.
Dr. George H. M. Lawrence, Director, Rachel McMasters Miller Hunt Botanical Library, Pittsburgh, Pa.
Sir Herbert Howard, Commonwealth Agriculture Bureau, Farnroyal, Bucks., England.
Robert Mann, Lancaster Press, Lancaster, Pa.
Daniel D. Boone, Atlanta, Ga.
Lorna Maitland, London, England.
Dr. Rosa R. de Pirosky, Instituto de Oncologia, Buenos Aires, Argentina.
Harry Wheatcroft, Nottingham, England.
H. C. Greer, London, England.
Dr. Sheila Garratt, Stevens Institute of Technology, Hoboken, N. J.
Dr. George Slate, Agricultural Experiment Station, Geneva, N. Y.
D. Dwidjoseputro, Semerang, Indonesia.
Mrs. A. A. Plagman, Davenport, Iowa.
Dr. Pierre Dansereau, Montreal, Canada.
Norman Taylor, Editor of *Taylor's Encyclopedia of Gardening*, New York, N. Y.
Charles C. Johnson, co-author of *Wildflowers of North America*, New York, N. Y.
Stanley Smith, Curator of Herbarium, New York State Museum, Albany, N. Y.
Dr. Frits Went, Director, Missouri Botanical Garden, St. Louis, Mo.
R. Henry Norweb Jr., Director, Holden Arboretum, Cleveland, Ohio.

Gifts to the Library. The Library of The New York Botanical Garden has been the recipient of these gifts within the past few months: from George Schwartz, *Moments of Discovery*, two volumes, by George Schwartz and W. Bishop, editors, Basic Books, New York, 1958; from *Biological Abstracts* and from the libraries of the New York Zoological Society, the American Museum of Natural History, and Columbia University, books, periodicals, and pamphlets; from V. W. Fletcher, *Orquideas de Venezuela* by G. C. K. Dunsterville, Compania Shell de Venezuela, 1960.

Purchased from the Hoffman Fund in memory of the late Paul Hoffman, Editor of *Suburbia Today: Flowering Stones and Mid-day Flowers* by G. Schwantes, Ernest Benn Ltd., London, 1957; *Darwin, Wallace, and the Theory of Natural Selection*, including the Linnean Society Papers, by Bert James Lowenberg, Arlington Books, Cambridge, 1959; *Old Garden Roses*, Part 1, by Sacheverell Sitwell and James Russell, George Rainbird Ltd., London, 1955; and *Old Garden Roses*, Part 2, by Wilfred Blunt and James Russell, George Rainbird Ltd., London, 1957.

Commendable action was taken by The New York State Nurserymen's Association, Inc., at a recent session of its Board of Directors. A resolution was adopted encouraging the current regulatory program of the New York State Department of Agriculture and Markets that is directed at removing from sale, at the retail level, plant materials that are not viable. The Nurserymen's Association further resolved that the Department should extend its efforts to discourage and apprehend all house-to-house canvassing of uncertified plant materials by unlicensed vendors.

Edwin W. Kirk, Executive Secretary of the New York State Nurserymen's Association, sent copies of the resolution to the Federated Garden Clubs of New York State Inc., to the Horticultural Society of New York, and other organizations, as well as to the Commissioner of Agriculture of the State of New York. His accompanying letter closed with this remark, "Gardening is a way of life. Let's assure everyone who participates in gardening an enjoyable experience."

The Smithsonian Institution is reprinting Paul C. Standley's *Trees and Shrubs of Mexico*, Contr. U. S. National Herbarium, Vol. 23, 1920-26, Parts 1 (pp. xviii + 1-169), 2 (xxxvii + 171-515), 3 (pp. xxviii + 517-848), and 5 (ii + 1313-1721), in two paperbound volumes containing parts 1-3 and part 5, respectively. The price of these four parts is $20.00 postpaid. Part 4 (pp. xxxix + 849-1312), available in the original 1924 edition published by the U. S. National Museum, will be enclosed free of charge. Orders, accompanied by check, should be addressed to Publications Distribution Section, Smithsonian Institution, Washington 25, D. C.

Errata. November-December, 1960, page 205, first column, first line, should read Dr. B. O. Dodge; page 210, caption, third line, should read *Ocotea;* page 243, first column, first line, should read Royal Horticultural Society.

January-February, 1961, page 6, second column, fourth paragraph, first line, should read As far back as the 1860s . . .

March-April, 1961, page 50, second column, second paragraph, fourth line, should read Marjorie Anchel; page 69, under "Appointment of Assistant Director (Botany)," second paragraph, third line, should read the Royal Botanic Gardens in Kew, Surrey, England.

BOOK REVIEWS (from page 110)

THE WONDERLAND OF PLANTS. Shannon, Terry. unpaged, illustrated, part colored. Albert Whitman and Co., Chicago, Ill. 1960. $2.75

Ages six to nine will find here an accurate botany primer presented most attractively. The text and art work were checked by Dr. Mildred E. Mathias of the University of California.

WONDERS OF THE ANTHILL. Lavine, Sigmund A. 64 pages, illustrated, indexed. Dodd, Mead and Co., New York, N. Y. 1960. $2.95

The vivid personalities of ants and their diversified vocations make good reading for young and old.

LETTERS TO THE EDITOR

I have so enjoyed Elizabeth Lawrence's book *Gardens in Winter* that I am moved to write to the Editor of *The Garden Journal* about it. Miss Lawrence calls attention to the many interesting and delightful plants that can be grown outdoors all winter long in the southern states, but northern gardeners need not be deterred from reading this book by thinking that it is of no value to them.

Miss Lawrence writes of the many fine trees that are handsome in the winter because of bark or branch formation. She tells of different shrubs, such as the Chinese witch-hazel, which will bloom regularly in midwinter in New York and New England. This particular year with its great fall of snow has caused the flowers to appear some weeks later than usual.

There are chapters on herbaceous plants which are handsome in winter, in bloom or in leaf, and much about small bulbs, particularly the dwarf narcissi and the scillas, and such iris as *I. histroides*.

The book is illustrated with line drawings by Caroline Dorman which would give distinction to any garden book and are, for their purpose, better than any photographs could be.

All these things probably can be found in other books, but I never have seen them brought together in this way. What makes this book stand out is the delightful way in which Miss Lawrence brings her talks and correspondence with gardeners all over this country and abroad into its pages. I have always felt that one great weakness in American horticulture is the general lack of realization of what other gardeners are doing and what plant explorers or plant breeders have produced for our gardens. This utterly charming book makes me feel I know the people about whom Miss Lawrence writes and that they are friends, as indeed they should be. I heartily recommend *Gardens in Winter* to all gardeners, not for the factual information about plants, but for its introduction to so many delightful people.

JOHN C. WISTER, *Director*
Arthur Hoyt Scott Horticultural Foundation
Swarthmore, Pennsylvania

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